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July 3, 2019

Mr. James M. DiLorenzo
Remedial Project Manager
United States Environmental Protection Agency
Office of Site Remediation and Restoration
5 Post Office Square, Suite 100
Mail code: OSRR07-4
Boston, Massachusetts 02109-3912

Subject: Semi-Annual Status Report No. 24
October 2018 through March 2019
Olin Chemical Superfund Site
51 Eames Street
Wilmington, Massachusetts

Dear Mr. DiLorenzo:

On behalf of Olin Corporation, Wood Environment & Infrastructure Solutions, Inc. (Wood), formerly Amec Foster Wheeler, is submitting this *"Semi-Annual Status Report No. 24, Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts."* A CD copy is being sent directly to Mr. Garry Waldeck of the MassDEP. This report is being submitted in accordance with the requirements specified in Sections 1.III.E and 2.II.C of the Final Statement of Work (SOW) for the Olin Chemical Superfund Site. The SOW is incorporated by reference into the Administrative Settlement Agreement and Order of Consent for Remedial Investigation and Feasibility Study for the Olin Chemical Superfund Site, Wilmington, Massachusetts (USEPA CERCLA Docket No. 01-2007-0102).

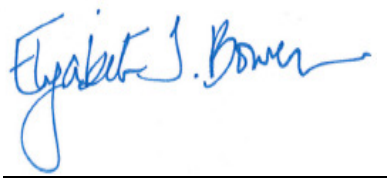
This document was prepared for the sole use of Olin Corporation and the United States Environmental Protection Agency, the only intended beneficiaries of our work. No other party shall rely on the information contained herein without prior written consent of Wood Environment & Infrastructure Solutions, Inc.

At your request, we are providing copies of these deliverables directly to the following recipients:

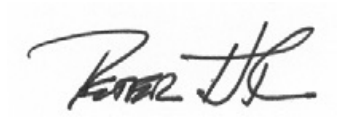
Garry Waldeck - MassDEP (1 electronic copy)
Jeff Brunelle - Nobis Engineering, Inc. (1 hard copy, 1 electronic copy)
Jeffrey Hull - Town of Wilmington (2 hardcopies, 2 electronic copies)
Martha Stevenson - WERC (2 hardcopies, 2 electronic copies)

If you have any questions concerning this deliverable, please do not hesitate to contact Mr. Chinny Esakkiperumal, Olin Corporation, at 423-336-4675.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.



Elizabeth T. Bowen
Project Manager



Peter H. Thompson
Senior Principal Hydrogeologist

cc: James Cashwell – Olin
Chinny Esakkiperumal – Olin
Garry Waldeck - MassDEP
Jeff Brunelle - Nobis Engineering, Inc.
Jeffrey Hull - Town of Wilmington
Martha Stevenson - WERC

Semi-Annual Status Report No. 24

Olin Chemical Superfund Site
51 Eames Street, Wilmington MA
6107190016

Prepared for:

Olin Corporation
3855 North Ocoee Street, Suite 200, Cleveland TN 37312

3-Jul-19

Semi-Annual Status Report No. 24

Olin Chemical Superfund Site

51 Eames Street, Wilmington, MA

6107190016

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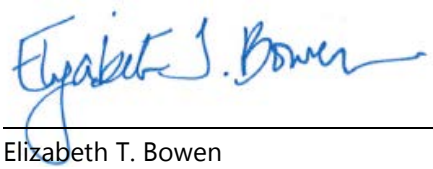
3-Jul-19

Prepared and Reviewed by:



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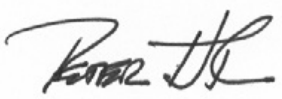
Project Manager



Peter Thompson
Senior Principal Hydrogeologist

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AMEC	AMEC Environment & Infrastructure, Inc.
BEHP	Bis(2-ethylhexyl)phthalate
CSL	Calcium Sulfate Landfill
DAPL	Dense Aqueous Phase Liquid
DMF	Dimethylformamide
EE/CA	Engineering Evaluation/Cost Analysis
EPH	Extractable Petroleum Hydrocarbons

IRS	Interim Response Steps
IRSWP	Interim Response Steps Work Plan
ISCO	In-situ Chemical Oxidation
LNAPL	Light Non-aqueous Phase Liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
MassDEP	Massachusetts Department of Environmental Protection
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSA	Method of Standard Additions
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter
NDMA	N-nitrosodimethylamine
NDPhA	N-nitrosodiphenylamine
NDPrA	N-nitroso di-n-propylamine
Olin	Olin Corporation
off-PWD	off-Property West Ditch
OU	Operable Unit
QA/QC	Quality Assurance/Quality Control
RAE	Remedial Alternatives Evaluation
RGP	Remediation General Permit
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RPD	Relative Percent Difference
SASR	Semi-Annual Status Report
Site	Olin Chemical Superfund Site
SVOC	Semi-Volatile Organic Compound
TAL	TestAmerica Laboratories, Inc.
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
VPH	Volatile Petroleum Hydrocarbon
Wood	Wood Environment & Infrastructure Solutions, Inc.

1.0 INTRODUCTION

This Semi-Annual Status Report (SASR) has been prepared for the Olin Chemical Superfund Site (the Site) in Wilmington, Massachusetts, on behalf of Olin Corporation (Olin) by Wood Environment & Infrastructure Solutions, Inc. (Wood, formerly Amec Foster Wheeler). The SASR has been prepared consistent with Section 2.II.C. of the Statement of Work, Remedial Investigation/Feasibility Study (RI/FS), Olin Chemical Superfund Site, prepared by the United States Environmental Protection Agency (USEPA) Region I – New England and dated June 2007 (USEPA, 2007). This SASR summarizes the monitoring activities conducted from October 2018 through March 2019 and presents monitoring data and analytical results including, but not limited to, groundwater, surface water, and sediment data from the Slurry Wall/Cap and Plant B monitoring programs.

The Site location is presented in **Figure 1-1**. **Figure 1-2** is a Site plan that identifies the three areas that are described in the Interim Response Steps Work Plan (IRSWP) including Slurry Wall/Cap Containment Area, Plant B, and the off-Property West Ditch (OPWD) area. This SASR summarizes field and reporting activities for the three areas where Interim Response Steps (IRS), as described in the IRSWP and DAPL Extraction Study, are being conducted.

The three specific IRSs include:

- Slurry Wall/Cap – monitoring of groundwater, surface water, and sediment in the area surrounding the Slurry Wall and inspection of the temporary cap;
- Plant B – operation, maintenance, and monitoring of the groundwater recovery/treatment system that was designed to remove and control migration of light non-aqueous phase liquid (LNAPL); and
- Dense Aqueous Phase Liquid (DAPL) Extraction – Design, installation and operation of a pilot study to evaluate the efficacy of DAPL extraction in the OPWD Area.

2.0 SLURRY WALL/CAP

The following sections present results of chemical analyses for groundwater, surface water, and sediment samples associated with the slurry wall/cap during the fourth quarter of 2018 and first quarter of 2019. Groundwater level data for the fourth quarter of 2018 and first quarter of 2019 are presented in the field activity reports contained in **Appendices A-1 and A-2**. The data validation memoranda for these sampling events are provided in **Appendices B-1 and B-2**, respectively. The results of these analyses are generally consistent with past results.

Olin personnel conducted weekly observations of the weir and South Ditch and recorded observations concerning wildlife, surface water conditions, and flocculent accumulation. These reports are reviewed by Wood and compiled in separate monthly reports, which are provided for the current reporting period in **Appendix C**.

2.1 Groundwater

Groundwater sampling and analysis for the fourth quarter of 2018 sampling event was completed from November 14th through 28th, 2018. The first quarter of 2019 sampling event was completed from April 3rd through 4th, 2019. Note, the first quarter sampling was implemented in April due to winter weather conditions and associated personnel safety.

The fourth quarter of 2018 sampling event included groundwater sample collection from 15 monitoring wells: GW-10S, GW-24, GW-25, GW-34SR, GW-34D, GW-35S, MP-2 #15, GW-43SR, GW-76S, GW-78S, GW-79S, GW-201S, GW-202S, GW-202D, and GW-CA1; and five piezometers: PZ-16RRR, PZ-17RRR, PZ-18R, PZ-24, and PZ-25 located along the South Ditch consistent with the Final IRSWP. The first quarter of 2019 sampling event included groundwater sample collection from five monitoring wells: GW-25, GW-78S, GW-79S, GW-202S, and GW-202D; and five piezometers: PZ-16RRR, PZ-17RRR, PZ-18R, PZ-24, and PZ-25.

Quality Assurance/Quality Control (QA/QC) samples include two field duplicates and matrix spike/matrix spike duplicates (MS/MSD).

The sample locations, details of sampling, and the analytical program are identified in the field activity reports. Field activity reports for the fourth quarter of 2018 and first quarter of 2019 sampling events are contained in **Appendices A-1 and A-2**, respectively. The field activity reports also contain tabulated final field parameter measurements collected at the time of sampling, sample collection field data records, and instrument calibration records. Groundwater samples were analyzed by TestAmerica Laboratories, Inc. (TAL) for ammonia, chloride, sulfate, specific conductance and filtered samples are analyzed for aluminum and chromium.

Table 2-1 and Table 2-2 summarize groundwater analytical results for referenced quarterly samples. The data validation memoranda for groundwater and surface water are included in **Appendices B-1 and B-2** and conclude that TAL results are useable as reported by the laboratory unless otherwise indicated in the validation report.

Appendix D-1 presents time series groundwater concentration plots for aluminum, ammonia, chloride, chromium, specific conductance, and sulfate from the south, southeast, west, and north areas surrounding the Containment Area. These plots include both current and historic data. Groundwater analytical data for monitoring well GW-43SR (west of the Containment Area) was added to **Appendix D** when it was replaced in November 2010, and piezometers PZ-24 and PZ-25 were added in June of 2011 at the request of USEPA. Piezometer PZ-24 and well GW-35S are interior to the Containment Area, while one well (GW-CA1) is located within the gravel equalization window of the Containment Area.

In general, the analytical results for dissolved metals (aluminum and chromium) in groundwater samples collected from within the Containment Area (GW-35S, GW-CA1, and PZ-24), south of the Containment Area (GW-78S, GW-202S, GW-202D, PZ-17RRR, PZ-18R, and PZ-25), southeast of the Containment Area (GW-79S, GW-201S, PZ-16RRR), west of the Containment Area (GW-24, GW-25, GW-42S (MP-2#15), GW-43SR, GW-76S), and north of the Containment Area (GW-10S, GW-34D, GW-34SR) are consistent with historical data and the previous reporting period and are stable within historical ranges (**Appendix D-1, Figures D-1.1 through D-1.10**).

Concentrations of dissolved aluminum and chromium in GW-202D (filtered samples) have declined from the maximum concentrations detected in 2008 and 2009 and have stabilized over the past several years (chromium) or continue to decline (aluminum). **Figure D-1.8** suggests an increase in the chromium concentration at well MP-2. Review of field data records indicates that during the 4th quarter 2018 sampling event, a sample was collected from MP-2#15 (at a depth of 10.5 feet) rather than MP-2#13 (at a depth of 13.5 feet). The most recent result exhibits typical variability for this well, which will continue to be monitored as requested. Data collected during future sampling events will be reviewed to determine if chromium concentrations at this location are increasing, or if the 4th quarter 2018 analytical result was anomalous and a function of sampling MP-2#15 rather than MP-2#13 as required by the sampling program.

The analytical results for ammonia in groundwater samples are consistent with historical data and are stable within historical ranges (**Figures D-1.11 through D-1.15**). Concentrations of ammonia in groundwater samples from locations GW-202D, GW-202S, PZ-16RRR, GW-78S, GW-79S, PZ-24, PZ-25, GW-79S, PZ-17RRR, 16RRR, GW-25, and GW-24 have declined from the maximum concentrations detected in 2008 and 2009 and have either remained consistent for the last several years or have continued to decline. GW-18R immediately upstream from the weir continues to show the greatest variability, however recent seasonal maximum concentrations are lower than those measured from 5 to 10 years ago. The concentrations detected in PZ-18R continue to show seasonality with the highest concentrations occurring in spring (May-June) and lowest levels occurring in the fall (November) **Figure D-1.11**. PZ-18R ammonia concentrations are usually higher than those found in groundwater (GW-202D and GW-202S) or in downstream pore water underlying South Ditch (PZ-17RRR).

Sulfate and specific conductivity have declined in GW-202S to concentrations that are generally consistent with historical data and are within historical ranges at other wells (**Figures D-1.21 through D-1.30**). Specific conductivity and sulfate concentrations are consistent in PZ-18R and GW-202D and continue to show the largest seasonal fluctuations.

Concentrations of chloride south of the Containment Area at GW-202S have increased slightly since 2012 (**Figure D-1.16**) but have now stabilized. This may reflect upgradient sources as described below.

Concentrations of chloride and specific conductivity located west and up gradient of the Containment Area have increased since 2010 at locations GW-24, GW-25, MP-2#13, and GW-43SR (**Figure D-1.18 and D-1.28**) and are interpreted to reflect industrial development activities and increased use of de-icing salts on adjacent properties since other sample parameter concentrations (aluminum, ammonia, chromium, sulfate) have not increased over that same period. Chloride and specific conductivity concentrations detected at location GW-76S have decreased since highs in 2013 (**Figure D-1.18 and D-1.28**). The highest concentrations of chloride in PZ-18R are seasonal as described above. Shallow groundwater on the south side of the Containment Area (GW-202S) has shown a similar pattern of slightly increasing chloride concentrations during the same time frame (**Figure D-1.16**).

Groundwater levels were measured from select groundwater monitoring wells and piezometers prior to each sampling event. Water level measurements are tabulated in **Appendices A-1 and A-2**. These measurements and the interpreted groundwater potentiometric surfaces are depicted on **Figures 2-1**

and 2-2. The water levels and interpreted groundwater potentiometric surface for the fourth quarter of 2018 and first quarter of 2019 are consistent with prior periods.

2.2 Surface Water

The fourth quarter of 2018 and first quarter of 2019 Surry Wall/Cap sampling events include the collection of surface water samples from seven locations ISCO-1, ISCO-2, ISCO-3, PZ-16RRR, PZ-17RRR, PZ-18R, and SD-17. Note, no sample was collected at location ISCO-3 during the fourth quarter due to deep mud impeding access to the South Ditch. Unfiltered samples were analyzed by TAL for aluminum, chromium, sodium, ammonia, chloride, nitrate, nitrite, sulfate, and specific conductance. In addition, filtered surface water samples were analyzed for metals: aluminum, chromium, and sodium. QA/QC samples include one field duplicate and one MS/MSD. The sample locations, details of sampling, and the analytical program are identified in the field activity report in **Appendix A-1 and A-2**.

Table 2-3 and Table 2-4 summarizes surface water analytical results for samples collected during the fourth quarter of 2018 and first quarter of 2019 sampling events. The surface water data validation memorandum is included in **Appendix B** and concludes that TAL's results are useable as reported by the laboratory unless otherwise indicated in the validation report.

Appendix D-2 presents time series surface water concentration plots for dissolved aluminum, dissolved chromium, ammonia, chloride, sulfate, and specific conductivity from the Upper South Ditch and Lower South Ditch areas. These plots include historic data along with data from the fourth quarter of 2018 and the first quarter of 2019 sampling events.

Detected concentrations and temporal patterns of the metals and inorganic parameters are consistent and within historical ranges from samples collected in the Upper South Ditch and Lower South Ditch. Dissolved aluminum and dissolved chromium in surface water from the Upper South Ditch and Lower South Ditch have decreased consistently since 2008 at sample location PZ-16RRR and since 2013 at sample locations SD-17 and ISCO-2 (**Figures D-2.1 through D-2.4**). Chromium now shows little seasonal variability. Ammonia, sulfate, and specific conductance in surface water samples have also decreased and stabilized since 2009 in the Upper South Ditch and Lower South Ditch and exhibit some seasonal variability (**Figures D-2.5 through D-2.12**). Concentrations in surface water above the weir (PZ-18RSW and ISCO-1) are lower than concentrations below the weir and have remained more stable (lacking indications of seasonality). Concentrations of chloride appear to have increased slightly since 2008 and 2009 in Upper South Ditch at locations ISCO-1 and PZ-18R and Lower South Ditch at location ISCO-3 consistent with trends in upgradient groundwater (**Figures D-2.7 and D-2.8**). It is assumed that these changes are the results of increased use of de-icing road salt at commercial operations along adjacent properties and roadways.

2.3 Sediment

Sediment samples were collected during the fourth quarter of 2018 sampling event from five locations SD-SD1, SD-SD2, SD-SD3, SD-SD4, and SD-SD5. QA/QC samples include one duplicate and one MS/MSD. These samples were analyzed for aluminum, chromium, iron, percent moisture, and percent solids.

Table 2-5 presents the analytical results for the fourth quarter of 2018 sediment sampling event. The data validation memorandum for sediment is included in **Appendix B** and concludes that results are useable as reported by the laboratory unless otherwise indicated in the validation report.

Appendix D-3 presents time series sediment concentration plots (**Figures D-3.1 through D-3.3**) for aluminum, chromium, and iron. These plots include shallow sediment data (collected between June 2003 and November 2018) for the sampled locations. Elevated detections of aluminum, chromium, and iron collected in 2016 and 2017 at locations SD-2, SD-3, and SD-5, have since decreased and are within historical

ranges of detected concentrations at these locations. The elevated concentrations in 2017 were likely attributable to the presence and incorporation of floc into the sediment sample. Based on the 2018 analytical results and trend graphs, total aluminum, chromium, and iron have been within historical ranges and indicate that post-remediation recontamination of the sediment is not occurring. We will continue to monitor the concentrations to ensure and verify trends.

2.4 Data Logger Data

Data loggers are deployed in 10 monitoring wells and piezometers: GW-10S, GW-35S, GW-CA1, GW-76S, GW-78S, GW-CA3S, GW-CA4S, GW-6S, PZ-24, and PZ-25, to continuously monitor groundwater elevation within and outside the Containment Area. **Appendix E** presents time series groundwater elevation plots (**Figure E-1 and Figure E-2**) compared to precipitation data measured at the Site. These plots include groundwater elevations from October 2018 through March 2019 and have been corrected for barometric pressure using Site specific barometric pressure data. The data acquisition rate remains one reading every hour.

Continuous water level data plots indicate groundwater within and outside of the Containment Area responds to recharge of the aquifer. There were not many recharge rain events in the second quarter and third quarter of 2018 which led to groundwater recession and elevation lows from April through July. Several significant rain events in the end of October and into November 2018 led to seasonal water elevation highs at the end of November 2018. Comparison of water levels in GW-35S and GW-CA1 indicates an outward flow gradient through the equalization window from November 2018 through March 2019. The continuous outward flow gradient since November may be related to the condition of the cap.

2.5 Temporary Cap Inspection

As detailed in SASR No. 18, the official temporary cap inspection frequency was reduced from quarterly to semi-annually. The inspection for the fourth quarter of 2018 was conducted on November 16, 2018 and for the first quarter of 2019 was conducted on March 29, 2019. The inspection field data records, which indicates observations, maintenance, and repairs completed on the temporary cap, is included in Appendix C of the fourth quarter of 2018 and first quarter of 2019 field activity reports (FARs) attached in **Appendix A**.

As stated previous SASRs, Olin continues to perform additional random inspections to ensure that potential maintenance needs are addressed in a timely fashion.

A portion of the polyethylene geomembrane has torn and is no longer serviceable. Olin is evaluating options for repair or replacement of the geomembrane and will advise USEPA of results of that evaluation prior to scheduling repair or replacement activities.

3.0 PLANT B

The following sections present results of chemical analysis of groundwater for the fourth quarter of 2018 and first quarter of 2019 Plant B sampling events. Groundwater level data from these sampling events are presented in field activity reports contained in **Appendices A-1 and A-2**. The data validation memoranda for the fourth quarter of 2018 and first quarter of 2019 are provided in **Appendices B-1 and B-2,** respectively.

Olin personnel collected monthly water level, LNAPL thickness, LNAPL recovery data, and sampled the treatment plant influent and effluent in accordance with the Remediation General Permit (RGP) requirements. Samples are analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total metals, hexavalent chromium, chloroform, total phenols, residual chlorine, total suspended solids (TSS), chloride, and pH. The analytical program for the RGP was described in the IRSWP (MACTEC, 2008) and is subject to revision under a new permit. The analytical data for the RGP are retained on-Property by Olin in accordance with that permit. Plant B sampling frequencies continue on a monthly basis. Treated groundwater is stored in the newly installed on-Site Plant B aboveground storage tanks (ASTs) and sampling is completed prior to discharge. A summary table of Plant B influent and treated water data is presented in **Table 3-1**. The monthly water level and LNAPL thickness data (October 2018 – March 2019) are summarized in **Tables 3-4 and 3-5** and **Figures 3-1 through 3-12**.

East Ditch observations are made from the embankment on a daily basis during normal working days by the Olin staff. The Plant B Water Treatment Plant Daily Report contains a check box for observation of LNAPL related sheens in the East Ditch. This check box is used if a sheen is observed. The daily report is an internal Plant B record of operating parameters for the treatment plant. Sheens in the East Ditch were not observed during the October 2018 through March 2019 monitoring period.

3.1 Groundwater

The fourth quarter of 2018 sampling event included groundwater sample collection from monitoring wells: B-03, GW-13, GW-16R, GW-101, IW-6, and IW-10. The first quarter of 2019 sampling event included groundwater sample collection from monitoring well GW-16R. Groundwater samples were collected and analyzed for trimethylpentenes, n-nitrosodiphenylamine (NDPhA), bis(2-ethylhexyl)phthalate (BEHP), volatile petroleum hydrocarbons (VPH), ammonia, iron, and pH. QA/QC samples include one duplicate and one MS/MSD.

The fourth quarter of 2018 and first quarter of 2019 sample locations, details of sampling, and the analytical program are described in the field activity reports (**Appendices A-1 and A-2**, respectively). **Tables 3-2 and 3-3** present analytical results from the fourth quarter of 2018 and first quarter of 2019 groundwater sampling events, respectively. Data validation memoranda for these sampling events are included in **Appendix B** and indicate the analytical results are useable as reported by the laboratory unless otherwise indicated in the validation report.

The fourth quarter of 2018 and first quarter of 2019 analytical results for trimethylpentenes, NDPhA, BEHP, VPH, ammonia, iron, and pH in groundwater remain consistent with past results.

Olin personnel measure groundwater levels from 25 monitoring wells and three groundwater extraction wells (IW-11, IW-12, and IW-13) on a monthly frequency. If the water level probe suggests the presence of LNAPL, the thickness of the LNAPL is measured. The monthly water table elevation data are presented in **Tables 3-4 and 3-5** and in **Figures 3-1 through 3-6** during the October 2018 through March 2019 reporting period.

3.2 Light Non-Aqueous Phase Liquid

The LNAPL layer in the vicinity of the Plant B treatment plant is not readily measurable by instrumentation. A protocol for LNAPL thickness measurement and visual confirmation of LNAPL was developed previously to address the interpretation of instrument response for what appears to be a very thin LNAPL layer at and below the meter sensitivity for detection (less than 0.01 feet). The LNAPL thickness measurement data for the reporting period are presented in **Figures 3-7 through 3-12**. LNAPL has been observed in both the observation wells and groundwater extractions wells. A layer of LNAPL has consistently been measured in wells GW-23, IW-11, and P5 with thin layers of LNAPL observed in wells 12-IN and IW-2.

The monthly LNAPL recovery data are presented in **Tables 3-4 and 3-5**. Over the reporting period, on average, approximately 0.02 gallons of LNAPL was recovered per month. The total LNAPL recovered for the October 2018 through March 2019 period was 0.1 gallons. Monthly and cumulative LNAPL recovery data are summarized in **Figure 3-13**. Groundwater levels relative to monthly LNAPL recovery are plotted and summarized in **Figure 3-14**.

The LNAPL recovery data indicate a stabilization of the LNAPL recovery rate since 2005 with all the recovered LNAPL coming from IW-11.

4.0 DAPL EXTRACTION

This section reports progress on the DAPL Pilot Study and summarizes communication between Olin and USEPA for the reporting period (October 2018 through March 2019).

4.1 Operations Status

During the reporting period the extraction system operated at an extraction rate of approximately 0.25 gpm and was online from October 2018 through March 2019.

4.2 Reporting Status

Periodic data plots for pH, and specific conductance from multilevel wells (ML-1, ML-2, MP-2), the extraction well (EW-1) and induction logging results (ILW-1, and ILW-2) are sent directly to USEPA by Olin on an as requested basis.

5.0 ADDITIONAL ACTIVITIES

During the reporting period for this SASR (fourth quarter of 2018 and first quarter 2019), Olin has completed or continued to progress on activities as described below. In addition, quarterly residential drinking water samples were collected from several residences in proximity of the Site.

Additional Remedial Investigation (RI) activities that were conducted are also described.

5.1 Major Submittals, Meetings and Other RI/FS Activities

The following major submittals and meeting occurred during the reporting period.

- On November 15, 2018 USEPA corresponded by letter denying proposed 2016 changes to optimize the IRSWP monitoring program but approved and expanded upon other proposed monitoring resulting in a request to conduct a comprehensive and expanded quarterly monitoring program in 2019.
- On November 30, 2018 Olin submitted a revised IRSWP addendum to modify the Plant B Continued OM&M Plan. USEPA responded to this request in a letter dated March 21, 2019.
- On December 10, 2018 Olin and USEPA met to discuss the Conceptual Site Model (CSM) for OU3.
- From December 18 to December 20, 2018 Olin and USEPA were on-site abandoning borehole OC-BB-2-2018 under a procedure that was an agreed upon November 19, 2019. A memorandum on the abandonment was submitted to USEPA on January 18, 2019.
- On January 2, 2019 Olin responded in writing to USEPA comments dated September 25, 2018 on the Draft OU3 RI report, the Draft OU3 BHHRA, the Draft OU1 & OU2 FS, the Draft OU3 FS, and reports on Containment Area Bedrock Borings and a Rock Matrix Sampling Work Plan.
- On January 3, 2019 Olin submitted SASR No. 23 to the USEPA.
- On January 21 Olin submitted a Draft updated Quality Assurance Project Plan for USEPA review.
- On March 8, 2019 USEPA responded to Olin's January 2, 2019 written response to comments.
- Olin and USEPA again held meetings on March 26, 2019 to discuss the CSM for OU3 following a February 20th conference call.

There were no additional major submittals specific to the OU3 RI/FS process during the reporting period.

5.2 Residential Drinking Water Sampling

The following paragraphs summarize water supply sampling activities at residential locations in accordance with methods in the approved RI/FS Work Plan, and as modified by the Summary Report for the 2010 Residential Drinking Water Program and the Phase I Private Well Sampling proposal.

Fourth quarter 2018 private well sampling was completed on December 6 and 7, 2018. Six residences: Map 2/Lot 7, Map 15/Lot 2C, Map 24/Lot 54, Map 24/Lot 63, Map 24/Lot 64, and Map 24/Lot 94 were sampled and analyzed for the following parameters: SVOCs, N-nitrosodimethylamine (NDMA), N-nitroso di-n-propylamine (NDPrA), metals, hexavalent chromium, anions (chloride, sulfate, nitrate, nitrite), and ammonia. Two residences: Map 24/Lot 66, and Map 24/Lot 72 were sampled and analyzed for: NDMA, NDPrA, metals, anions, and ammonia. One residence: Map 14/Lot 2B was sampled and analyzed for: NDMA, NDPrA, metals, hexavalent chromium, anions, and ammonia. Six residences: Map 3/Lot 7, Map 1/Lot 6D, Map 1/Lot 6C, Map 3/Lot 2F, Map 3/Lot 2, and Map 3/Lot 2D were sampled and analyzed for NDMA only.

Samples were not collected from locations: Map 24/Lot 65 and Map 27/Lot 14C because the well was shut off for the winter season. Samples were not collected at location Map 24/Lot 116 because access has not been granted.

First quarter 2019 private well sampling was completed on March 21-22, 2019 at the same residences and for the same analysis as listed during the December 2018 event (above) with the following exceptions: Samples were not collected from Map 24/Lot 72 because the property has been sold and the new owners have not granted access.

Location Map 3/Lot 7 was resampled in April 2019 for NDMA analysis only.

Data from the December 2018 and March2019 and April 2019 residential drinking water sampling events are summarized in **Tables 5-1 and 5-2**, respectively. The validation memoranda for the December 2018, March 2019 and April 2019 private well sampling event are attached in **Appendix B**.

5.3 Plant B Pumping Rate Reduction Test

The proposed Pumping Rate Reduction test is still officially on hold; however, some related monitoring activities were conducted in conjunction with temporary suspension of Plant B operations as described in Section 3.0.

5.4 OU1 and OU2 Remedial Investigation Sampling and Analytical Results

No additional OU1 and OU2 sampling activities have been completed during this reporting period. The OU1/ OU2 Draft Final Remedial Investigation Report was submitted to EPA on July 24, 2015 and was approved by USEPA.

5.5 OU3 Remedial Investigation Groundwater Sampling and Analytical Results

A full water level synoptic gauging event was completed in October 2018 following the March 2018 revised OU3 RI submittal. Results from this event will be included in a revised RI report.

A full OU3 comprehensive groundwater monitoring event was implemented between early March and early May 2019. Results from the OU3 comprehensive groundwater sampling event will be provided under separate cover.

Additional quarterly sampling for a subset of the comprehensive well list is scheduled for September and December 2019; however, monitoring wells located in Maple Meadow Brook will not be sampled until safety concerns are addressed.

5.6 Calcium Sulfate Landfill

Groundwater sampling at the Calcium Sulfate Landfill (CSL) has been completed consistent with the Massachusetts Department of Environmental Protection (MassDEP) approved semi-annual monitoring schedule (May and November). Groundwater samples were collected from select monitoring wells identified in **Figure 5-1**. Samples were collected and submitted by Olin personnel for the following analysis: total dissolved solids (TDS), total metals (calcium, sodium, aluminum, manganese, iron, chromium, and nickel), chloride, sulfate, and alkalinity. The data validation memorandum for the CSL groundwater monitoring program is attached in **Appendix B**. The CSL data (2019-2020) will be summarized and submitted to MassDEP in the 2020 biennial report.

6.0 REFERENCES

AMEC Environnent & Infrastructure, Inc. (AMEC), 2012. Operations, Maintenance & Performance Monitoring Plan, DAPL Extraction Pilot Test for the Olin Chemical Superfund Site in Wilmington, MA, October 8, 2012.

MACTEC Engineering and Consulting, Inc. (MACTEC), 2008. *Final Interim Response Steps Work Plan*, *Olin Chemical Superfund Site, Wilmington, Massachusetts*. August 8, 2008.

Tables

Table 2-1
Slurry Wall/Cap Analytical Results for Fourth Quarter 2018 Groundwater Sampling
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-GW-10S 11/15/2018	OC-GW-201S 11/15/2018	OC-GW-202D 11/14/2018	OC-DUP-GW-202D 11/14/2018	OC-GW-202S 11/14/2018	OC-GW-24 11/15/2018	OC-GW-25 11/15/2018	OC-GW-34D 11/15/2018	OC-GW-34SR 11/15/2018	OC-GW-35S 11/15/2018
Metals, Filtered (mg/L)										
Aluminum	5.2	0.088 J	0.82	0.81	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	0.0015 J	0.048	0.21	0.21	0.0028 J	0.005 U	0.0044 J	0.012	0.0011 J	0.0056
Inorganics (mg/L)										
Nitrogen, as Ammonia	2.4	110	29 J	150 J	31	18	20	4.6	0.19 J	4.9
Chloride	44	95	240	250	160	77	330	3.1	1.4	1.7
Sulfate	88	1200	920	960	100	25	40	22	6.6	250
Specific Conductance (mS/cm)	0.35	3.0	2.8	2.8	0.97	0.56	1.3	0.12	0.083	0.081

Notes:
mg/L - milligrams per liter
mS/cm - milliSiemen per centimeter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Table 2-1
Slurry Wall/Cap Analytical Results for Fourth Quarter 2018 Groundwater Sampling
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-GW-42S (MP2 PORT 15) 11/28/2018	OC-GW-43SR 11/28/2018	OC-DUP-GW-43SR 11/28/2018	OC-GW-76S 11/15/2018	OC-GW-78S 11/14/2018	OC-GW-79S 11/14/2018	OC-GW-CA-1 11/15/2018	OC-PZ16RRR 11/14/2018
Metals, Filtered (mg/L)								
Aluminum	0.53	0.19 J	0.17 J	0.34	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	0.064	0.0013 J	0.0014 J	0.0025 J	0.0023 J	0.0056	0.0088	0.009
Inorganics (mg/L)								
Nitrogen, as Ammonia	1.4	0.78 J	0.83	6.1	33	51	0.54	100
Chloride	230	230	230	37	8.4	100	14	160
Sulfate	9.4	24	24	27	460	540	85	780
Specific Conductance (mS/cm)	0.91	0.93	0.94	0.24	1.4	1.7	0.67	2.4

Notes:
mg/L - milligrams per liter
mS/cm - milliSiemen per centimeter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Table 2-1
Slurry Wall/Cap Analytical Results for Fourth Quarter 2018 Groundwater Sampling
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-PZ17RRR 11/14/2018	OC-PZ18R 11/14/2018	OC-PZ-24 11/15/2018	OC-PZ-25 11/15/2018
Metals, Filtered (mg/L)				
Aluminum	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	0.0063	0.032	0.037	0.0098
Inorganics (mg/L)				
Nitrogen, as Ammonia	30	160	35	10 U
Chloride	13	500	7.2	15
Sulfate	310	1100	790	360
Specific Conductance (mS/cm)	1.0	3.7	1.9	1.2

Notes:
mg/L - milligrams per liter
mS/cm - milliSiemen per centimeter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Prepared by: KMS 6/18/19
Checked by: CTM 6/25/19

Table 2-2
Slurry Wall/Cap Analytical Results for First Quarter 2019 Groundwater Sampling
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-GW-202D 4/3/2019	OC-GW-202S 4/3/2019	OC-GW-25 4/4/2019	OC-GW-78S 4/3/2019	OC-GW-79S 4/4/2019	OC-PZ-16RRR 4/4/2019	OC-PZ-17RRR 4/3/2019	OC-PZ-18R 4/3/2019	OC-PZ-24 4/3/2019	OC-PZ-25 4/3/2019
Metals, Filtered (mg/L)										
Aluminum	0.85	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chromium	0.20	0.0038 J	0.0044 J	0.0048 J	0.004 J	0.0071	0.0075	0.048	0.021	0.015
Inorganics (mg/L)										
Nitrogen, as Ammonia	110	31	14	24	61	90	28	200	25	28
Chloride	140	110	300	8.2	160	130	11	580	7.4	21
Sulfate	860	170	44	440	800	530	440	1200	760	430
Specific Conductance (mS/cm)	2.4	1.0	1.3	1.4	2.1	1.8	1.4	3.9	1.8	1.4

Notes:
mg/L - milligrams per liter
mS/cm - milliSiemen per centimeter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Prepared by: KMS 6/18/19
Checked by: CTM 6/25/19

Table 2-3
Slurry Wall/Cap Analytical Results for Fourth Quarter 2018 Surface Water Sampling
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-ISCO1 12/4/2018	OC-ISCO2 12/4/2018	OC-PZ-16RRRSW 12/4/2018	OC-PZ-17RRRSW 12/4/2018	OC-PZ-18RSW 12/4/2018	OC-DUP-PZ-18RSW 12/4/2018	OC-SD-17 12/4/2018
Metals, Total (mg/L)							
Aluminum	0.19 J	0.69	0.39	0.29	0.22	0.20	0.27
Chromium	0.0091	0.021	0.022	0.027	0.0095	0.009	0.026 J
Sodium	85	66	81	85	88	87	86
Metals, Filtered (mg/L)							
Aluminum	0.17 J	0.32	0.30	0.23	0.18 J	0.16 J	0.33
Chromium	0.0084	0.013	0.018	0.023	0.0082	0.0077	0.04 J
Sodium	93	71	86	92	92	87	90
Inorganics (mg/L)							
Nitrogen, as Ammonia	9.0	11	14	13	7.5	8.7	11
Chloride	150	110	130	140	150	150	140
Nitrate as N	0.30	0.41	0.34	0.29	0.30	0.32	0.30
Nitrite as N	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Sulfate	50	98	90	81	50	52	81
Specific Conductance (mS/cm)	0.71	0.67	0.75	0.75	0.70	0.71	0.75

Notes:
mg/L - milligrams per liter
mS/cm - milliSiemen per centimeter
U - not detected,
value is the detection limit
J - value is estimated

Prepared by: KMS 6/18/19
Checked by: CTM 6/25/19

Table 2-4
Slurry Wall/Cap Analytical Results for First Quarter 2019 Surface Water Sampling
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC- ISCO1 4/2/2019	OC- ISCO2 4/2/2019	OC- ISCO3 4/2/2019	OC-PZ-16RRRSW 4/2/2019	OC-PZ-17RRRSW 4/2/2019	OC-PZ-18RSW 4/2/2019	OC-SD-17 4/2/2019
Metals, Total (mg/L)							
Aluminum	0.11 J	0.43	0.2 U	0.26	0.12 J	0.096 J	0.11 J
Sodium	120	94	140	120	120	130	120
Chromium	0.0091	0.022	0.005 U	0.018	0.022	0.0088	0.023 J
Metals, Filtered (mg/L)							
Aluminum	0.094 J	0.14 J	0.2 U	0.071 J	0.16 J	0.083 J	0.53 J
Sodium	130	98	140	120	130	120	130
Chromium	0.0075	0.0084	0.005 U	0.0099	0.019	0.0051	0.089 J
Inorganics (mg/L)							
Chloride	210	150	290	180	200	220	200
Nitrate as N	0.44	0.64	0.99	0.54	0.45	0.44	0.45
Nitrite as N	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Nitrogen, as Ammonia	11	16	0.73	20	22	12	14
Specific Conductance **(mS/cm)**	1.0	0.99	1.2	1.1	1.2	1.0	1.2
Sulfate	68	140	25	150	140	66	140

Notes:
mg/L - milligrams per liter
mS/cm - milliSiemen per centimeter
U - not detected,
value is the detection limit
J - value is estimated

Prepared by: KMS 6/20/19
Checked by: CTM 6/25/19

Table 2-5
Slurry Wall/Cap Analytical Results for Fourth Quarter 2018 Sediment Sampling
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-SD1 12/4/2018	OC-SD2 12/4/2018	OC-SD3 12/4/2018	OC-SD4 12/4/2018	OC-SD5 12/4/2018	OC-SD5-DUP 12/4/2018
Metals, Total (mg/kg)						
Aluminum	7400 J	18000	16000	8500	11000	9900
Chromium	15	1800	1100	28	360 J	130 J
Iron	7600 J	14000	13000	10000	13000	17000
Inorganics (mg/kg)						
Percent Moisture	71.4	42.8	49.9	69.5	56.5	69.4
Percent Solids	28.6	57.2	50.1	30.5	43.5	30.6

Notes:
mg/kg - milligrams per kilogram
J - value is estimated

Prepared by: KMS 6/18/19
Checked by: CTM 6/25/19

Table 3-1
Plant B Analytical Results for RGP Sampling (October 2018 - March 2019)
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	Plant B Influent OC-INF-112818 11/28/2018	Plant B Influent OC-INF-120618 12/6/2018	Plant B Influent OC-INF-121418 12/14/2018	Plant B Influent OC-INF-122018 12/20/2018	Plant B Influent OC-INF-122718 12/27/2018	Plant B Influent OC- INF-010319 1/3/2019	Plant B Influent OC-INF- 010919 1/9/2019	IDW OC-Inf- 021219 2/12/2019	IDW OC-INF030719 3/7/2019	IDW OC-T11-112018 11/20/2018	IDW OC-T5-120418 12/4/2018	IDW OC-T4-120518 12/5/2018	IDW OC-T10-120618 12/6/2018	IDW OC-T3-120618 12/6/2018	IDW OC-T11-121118 12/11/2018	IDW OC-T3-122018 12/20/2018
VOCs (mg/L)																
1,2-Dichlorobenzene	0.00023 J	0.001 U	0.001 U	0.0002 J	0.00012 J	0.00033 J	0.00025 J	0.001 U	0.00025 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.001 U	0.001 U	0.001 U	0.00016 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.00015 J	0.001 U	0.001 U	0.001 U	0.00014 J	0.001 U	0.00019 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
2,4,4-Trimethyl-1-pentene	0.16 E	0.34 *	0.25 *	0.28	0.26 *	0.17	0.19	0.23	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U *	0.001 U
2,4,4-Trimethyl-2-pentene	0.07	0.13 *	0.08	0.1	0.1 *	0.062	0.078	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U *	0.001 U
Acetone	0.0078	0.0048 J	0.05 U	0.025 U	0.0066	0.05 U	0.05 U	0.05 U	0.005 U	0.0022 J *	0.0012 J	0.0035 J *	0.0013 J	0.0011 J	0.005 U	0.0019 J
Ethylbenzene	0.001 U	0.00022 J	0.00016 J	0.001 U	0.00018 J	0.00023 J	0.00014 J	0.0002 J	0.00013 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Toluene	0.003	0.00017 J B	0.001 U	0.001 U	0.001 U	0.001 U	0.00011 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Phenolics, Total Recoverable	0.0074 J	0.01	0.015	0.017	0.0067 J	0.01 U	0.011	0.0098	0.012	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0086 J F1
SVOCs (mg/L)																
3 & 4 Methylphenol	0.0055 J	0.1 U	0.1 U	0.01 U	0.1 U	0.01 U	0.01 U	0.0095 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
3-Methylphenol	0.0055 J	0.1 U	0.1 U	0.01 U	0.1 U	0.01 U	0.01 U	0.0095 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
4-Methylphenol	0.0055	0.05 U	0.05 U	0.005 U	0.05 U	0.005 U	0.005 U	0.0048 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(a)anthracene	0.005 U	0.05 U	0.05 U	0.005 U	0.05 U	0.005 U	0.005 U	0.0048 U	0.005 U	0.005 U	0.005 U *	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(a)pyrene	0.005 U	0.05 U	0.05 U	0.005 U	0.05 U	0.005 U *	0.005 U	0.0048 U	0.005 U *	0.005 U	0.005 U *	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(b)fluoranthene	0.005 U	0.05 U	0.05 U	0.005 U	0.05 U	0.005 U	0.005 U	0.0048 U	0.005 U	0.005 U	0.005 U *	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Benzo(k)fluoranthene	0.005 U	0.05 U	0.05 U	0.005 U *	0.05 U	0.005 U	0.005 U	0.0048 U	0.005 U	0.005 U *	0.005 U *	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U *
Bis(2-Chloroethyl)ether	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U *	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U
Bis(2-Ethylhexyl)phthalate	0.34	0.1 U	0.1 U	0.0028 J	0.1 U	0.096	0.091	0.0075 J	0.0025 J B	0.01 U	0.01 U *	0.01 U	0.01 U	0.002 J	0.01 U	0.01 U
Chrysene	0.005 U	0.05 U	0.05 U	0.005 U *	0.05 U	0.005 U	0.005 U	0.0048 U	0.005 U	0.005 U	0.005 U *	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U *
Dibenz(a,h)anthracene	0.005 U *	0.05 U	0.05 U	0.005 U *	0.05 U	0.005 U	0.005 U	0.0048 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U *
Hexachlorobenzene	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U
Indeno(1,2,3-cd)pyrene	0.005 U *	0.05 U	0.05 U	0.005 U	0.05 U	0.005 U	0.005 U	0.0048 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
N-Nitrosodimethylamine	0.01 U	0.1 U *	0.1 U *	0.01 U	0.1 U	0.01 U	0.01 U	0.0095 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U *	0.01 U *	0.01 U	0.01 U
Pentachlorophenol	0.01 U *	0.1 U	0.1 U	0.01 U *	0.1 U	0.01 U	0.01 U	0.0095 U	0.01 U	0.01 U	0.01 U *	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U *
Phenol	0.0017 J	0.015 J	0.05 U	0.034	0.05 U	0.03	0.034	0.0048 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total Metals (mg/L)																
Antimony	0.003 U	0.003 U	0.003 U	0.0017 J	0.0052	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
Arsenic	0.022	0.011	0.0098	0.0075 B	0.0077 B	0.0099	0.01	0.012	0.0067	0.00088 J	0.0012 B	0.00042 J	0.00069 J	0.00063 J	0.00084 J	0.001 B
Cadmium	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.00022 J	0.0005 U
Chromium, Hexavalent	0.0006 U F1	0.0003 U	0.0015 U H	0.0003 U H	0.0003 U	0.0003 U	0.0003 U	0.0003 U F1	0.0003 U F1		0.0003 J B	0.0003 U	0.00017 J B	0.0003 U	0.0003 U	0.0003 U H
Chromium, Trivalent	0.005 U	0.024	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.025	0.026	0.032	0.005 U	0.005 U
Copper	0.0067	0.013	0.0077 B	0.0048	0.002	0.0038	0.0027	0.00078 J	0.001 J	0.002 U	0.00065 J	0.0061	0.0083	0.0099	0.0071 B	0.002 U
Iron	20	6.2 V	6.2	4.7	4.9	8.7	8.4	8	4.6	0.1 U	0.1 U	0.096 J	0.1 U	0.092 J	0.056 J	0.066 J
Lead	0.0012	0.00026 J	0.0005 U	0.00059	0.00037 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0016	0.0005 U	0.00021 J	0.00018 J	0.00031 J	0.00033 J	0.0005 U
Mercury	0.0002 U	0.0002 U	0.00027	0.0002 U ^	0.0002 U	0.0002 U	0.0002 U	0.0002 U ^	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U ^
Nickel	0.0031	0.0027	0.0013 J	0.0029	0.002 U	0.0024	0.002	0.002 U	0.001 J	0.0019 J	0.002 U	0.0031	0.0027	0.0029	0.0013 J	0.0011 J
Silver	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.00068	0.0005 U
Zinc	0.022 B	0.011 J	0.02 U	0.035	0.021	0.012 J	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Oil and Grease (mg/L)																
Total Petroleum Hydrocarbons	5 U *	5.2 U	5.1 U	5.2 U *	6.5 F1 B	4.4 J B	4.9 U	4.9 U	5.1 U	5.3 U F1	5.3 U F1 *	5.2 U	5.1 U	5.1 U	4.7 U	5.3 U F1 *
Inorganic Compounds (mg/L)																
Chloride	23	75	120	110	90	16	1	140	120	220	220	200	180	150	170	120
Chlorine	0.02 U HF	0.02 U HF	0.02 HF	0.02 HF	0.02 U HF	0.02 HF	0.4 U HF	0.4 U HF	0.4 U HF	0.02 U HF	0.02 U HF	0.02 U HF	0.01 J HF	0.02 U HF	0.02 U HF	0.01 J HF
Nitrogen, as ammonia	7.4 B	6.6 B	5.7	7.1	2.1 B	9.5 B	11	3.5	10	0.32 B	0.21 F1	1 B	1.2 B	1.8 B	1.2	3.5
Sulfate	58	54 B	53	53 B	32	59	5.4	44	50	54	56	37	32 B	27 B	43 B	39 B
Total Suspended Solids	9.2	8.8	12	11	5.6	12	16	12	5	4 U	4 U	4 U	4 U	4 U	4 U	4 U

Notes:
mg/L - milligrams per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated
B - Compound was found in the
blank and sample
* - LCS or LCSD exceeds the
control limits
E - Exceeded the calibration
range

Table 3-1
Plant B Analytical Results for RGP Sampling (October 2018 - March 2019)
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	IDW OC-T4-122618 12/26/2018	IDW OC-T10-122718 12/27/2018	IDW OC-T11-010319 1/3/2019	IDW OC-T5 - 010719 1/7/2019	IDW OC-T3 - 012419 1/24/2019	IDW OC-T10-012919 1/29/2019	IDW OC-T11-012919 1/29/2019	IDW OC-T4-013119 1/31/2019	IDW OC-T II- 021219 2/12/2019	IDW OC-TI0- 021419 2/14/2019	IDW OC-T3-030719 3/7/2019	IDW OC-T10 - 031919 3/19/2019	IDW OC-T11-032019 3/20/2019	IDW OC-T3-032519 3/25/2019	IDW OC-T4-032519 3/25/2019
VOCs (mg/L)															
1,2-Dichlorobenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
2,4,4-Trimethyl-1-pentene	0.001 U *	0.001 U *	0.001 U	0.001 U *	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.25	0.001 U	0.001 U	0.001 U	0.001 U
2,4,4-Trimethyl-2-pentene	0.001 U *	0.001 U *	0.001 U	0.001 U *	0.001 U	0.001 U	0.001 U	0.001 U *	0.001 U	0.001 U	0.11	0.001 U	0.001 U	0.001 U	0.001 U
Acetone	0.005 U	0.001 J	0.0011 J	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.0041 J	0.005 U	0.0018 J	0.0011 J	0.005 U
Ethylbenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Toluene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Phenolics, Total Recoverable	0.01 U	0.01 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
SVOCs (mg/L)															
3 & 4 Methylphenol	0.01 U	0.01 U	0.01 U	0.01 U H	0.011 U	0.0097 U	0.0096 U	0.0095 U	0.0096 U	0.0097 U	0.01 U	0.01 U	0.01 U	0.0095 U	0.0095 U
3-Methylphenol	0.01 U	0.01 U	0.01 U	0.01 U H	0.011 U	0.0097 U	0.0096 U	0.0095 U	0.0096 U	0.0097 U	0.01 U	0.01 U	0.01 U	0.0095 U	0.0095 U
4-Methylphenol	0.005 U	0.005 U	0.005 U	0.005 U H	0.0053 U	0.0049 U	0.0048 U	0.0048 U	0.0048 U	0.0049 U	0.005 U	0.005 U	0.005 U	0.0048 U	0.0048 U
Benzo(a)anthracene	0.005 U	0.005 U	0.005 U	0.005 U H	0.0053 U	0.0049 U	0.0048 U	0.0048 U	0.0048 U	0.0049 U	0.005 U	0.005 U	0.005 U	0.0048 U	0.0048 U
Benzo(a)pyrene	0.005 U	0.005 U	0.005 U *	0.005 U H	0.0053 U	0.0049 U	0.0048 U	0.0048 U	0.0048 U	0.0049 U	0.005 U *	0.005 U	0.005 U	0.0048 U	0.0048 U
Benzo(b)fluoranthene	0.005 U	0.005 U	0.005 U	0.005 U	0.0053 U	0.0049 U	0.0048 U	0.0048 U	0.0048 U	0.0049 U	0.005 U	0.005 U	0.005 U	0.0048 U	0.0048 U
Benzo(k)fluoranthene	0.005 U	0.005 U	0.005 U	0.005 U	0.0053 U	0.0049 U	0.0048 U	0.0048 U	0.0048 U	0.0049 U	0.005 U	0.005 U	0.005 U	0.0048 U	0.0048 U
Bis(2-Chloroethyl)ether	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00003 U	0.00005
Bis(2-Ethylhexyl)phthalate	0.01 U	0.0012 J	0.01 U	0.01 U	0.0064 J	0.0097 U	0.0096 U	0.0095 U	0.0096 U	0.0097 U	0.002 J B	0.01 U	0.01 U	0.0095 U	0.0095 U
Chrysene	0.005 U	0.005 U	0.005 U	0.005 U	0.0053 U	0.0049 U	0.0048 U	0.0048 U	0.0048 U	0.0049 U	0.005 U	0.005 U *	0.005 U *	0.0048 U	0.0048 U
Dibenz(a,h)anthracene	0.005 U	0.005 U	0.005 U	0.005 U	0.0053 U	0.0049 U	0.0048 U	0.0048 U	0.0048 U	0.0049 U	0.005 U	0.005 U	0.005 U	0.0048 U	0.0048 U
Hexachlorobenzene	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 J	0.00011
Indeno(1,2,3-cd)pyrene	0.005 U	0.005 U	0.005 U	0.005 U *	0.0053 U	0.0049 U	0.0048 U	0.0048 U	0.0048 U	0.0049 U	0.005 U	0.005 U	0.005 U	0.0048 U	0.0048 U
N-Nitrosodimethylamine	0.01 U	0.01 U	0.01 U	0.01 U	0.011 U	0.0097 U	0.0096 U	0.0095 U	0.0096 U	0.0097 U	0.01 U	0.01 U *	0.01 U *	0.0095 U	0.0095 U
Pentachlorophenol	0.01 U *	0.01 U	0.01 U	0.01 U	0.011 U	0.0097 U	0.0096 U	0.0095 U	0.0096 U	0.0097 U	0.01 U	0.01 U	0.01 U *	0.0095 U	0.0095 U
Phenol	0.005 U	0.005 U	0.005 U	0.005 U	0.0053 U	0.0049 U	0.0048 U	0.0048 U	0.0048 U	0.0049 U	0.0029 J	0.005 U	0.005 U	0.0048 U	0.0048 U
Total Metals (mg/L)															
Antimony	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
Arsenic	0.0007 J B	0.0012 B	0.0014	0.0018	0.001	0.0015	0.0015	0.0012	0.002	0.0019	0.0011	0.0025	0.0022 B	0.0018 B	0.0026 B
Cadmium	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Chromium, Hexavalent	0.00014 J B	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U H	0.00028 J H	0.00026 J H	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U
Chromium, Trivalent	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Copper	0.0017 J	0.00086 J	0.002 U	0.0012 J	0.002 U	0.002 U	0.0019 J	0.002 U	0.002 U	0.002 U	0.0014 J	0.00074 J	0.002 U	0.002 U	0.002 U
Iron	0.11	0.1 U	0.1 U	0.1 U	0.17	0.1 U	0.04 J	0.19	0.1 U	0.1 U	0.25	0.1 U	0.1 U	0.13 B	0.19 B
Lead	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Mercury	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U ^	0.0002 U	0.0002 U	0.0002 U	0.0002 U ^	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel	0.001 J	0.002 U	0.002 U	0.002 U	0.0012 J	0.002 U	0.002 U	0.002 U	0.002 U	0.0013 J	0.0012 J	0.00095 J	0.002 U	0.0013 J	0.0014 J
Silver	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Zinc	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.0098 J	0.02 U	0.02 U	0.02 U
Oil and Grease (mg/L)															
Total Petroleum Hydrocarbons	2.6 J	5.2 U	2.7 J F1 B	5.2 U	4.8 U	5 U	4.8 U	5.1 U	5.1 U	5 U	4.8 U	4.8 U	5 U	4.8 U	4.8 U
Inorganic Compounds (mg/L)															
Chloride	130	120	120	130	110	110	110	87 F1	130	120	140	150	130	140	130
Chlorine	0.02 HF	0.01 J HF	0.01 J HF	0.4 U HF	0.4 U HF	0.4 U HF	0.4 U HF	0.4 U HF	0.4 U HF	0.4 U HF	0.4 U HF	0.4 U HF	0.4 U HF	0.4 U HF	0.4 U HF
Nitrogen, as ammonia	3.3 B	3 B	1.5 B	0.065 J	0.072 J	0.77	0.37	0.22	0.08 J	0.28	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Sulfate	43	41	44	34	43	44	43	43	46	37	44	48	49	42	43
Total Suspended Solids	4 U	4 U	4 U	1 U	1.4	1 U	1 U	1.1 U	1.1 U	1 U	1.2	1 U	10 U	2.5 U	2.6 U

Notes:
mg/L - milligrams per liter
U - analyte not detected, value shown is detection limit
J - value is estimated
B - Compound was found in the blank and sample
* - LCS or LCSD exceeds the control limits
E - Exceeded the calibration range

Prepared by: KMS 6/18/19
Checked by: CTM 6/25/19

Table 3-2
Plant B Analytical Results for Fourth Quarter 2018 Groundwater Sampling
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	B-03 OC-B-03 11/28/2018	GW-101 OC-GW-101 11/27/2018	GW-13 OC-GW-13 11/28/2018	GW-16R OC-GW-16R 11/28/2018	GW-16R OC-DUP GW 16R 11/28/2018	IW-10 OC-IW-10 11/27/2018	IW-6 OC-IW-6 11/27/2018
Volatile Organics (mg/L)							
2,4,4-Trimethyl-1-pentene	0.001 U	0.63	0.0011	1.7 J	1.5 J	0.0055	0.45
2,4,4-Trimethyl-2-pentene	0.001 U	0.23	0.001 U	0.67	0.59	0.0064	0.093
Semivolatile Organics (mg/L)							
Bis(2-Ethylhexyl)phthalate	0.026 U	0.025 U	0.00055 J	0.053 U	0.1 U	0.05 U	0.00064 J
N-Nitrosodiphenylamine	0.00043 J	0.85	0.0053 U	0.053 J	0.13 J	0.05 U	0.00028 J
Metals, Filtered (mg/L)							
Iron	0.31	4.6	0.074	2.0	2.1	0.29	28
Inorganics (mg/L)							
Nitrogen, as Ammonia	0.27 U	1.6 J	0.21 U	3.4	3.6	37	1.2 U
pH	5.8 J	7.1 J	5.6 J	6.7 J	6.7 J	7.4 J	6.5 J
Extractable Petroleum Hydrocarbons (mg/L)							
Benzo(ghi)perylene		0.0028 J				0.0098 J	0.0042 J
Indeno(1,2,3-cd)pyrene		0.01 U				0.003 J	0.01 U
Dibenz(a,h)anthracene		0.01 U				0.0058 J	0.0034 J
C11-C22 Aromatics Adjusted		0.78				0.54	0.05 U
C11-C22 Aromatics (unadj.)		0.79				0.56	0.038 JB
Volatile Petroleum Hydrocarbons (mg/L)							
Toluene	0.001 U	0.0028 J	0.001 U	0.05 U	0.05 U	0.001 U	0.01 U
Xylene, o	0.001 U	0.019	0.00028 J	0.019 J	0.02 J	0.00062 J	0.0078 J
C9-C12 Aliphatics	0.0026 J	0.048 J	0.005 U	0.25 U	0.25 U	0.005 U	0.18
C5-C8 Aliphatics	0.0092	1.1	0.019	2.3	2.3	0.032	0.42
C5-C8 Aliphatics (unadj.)	0.0092	1.1	0.019	2.3	2.3	0.032	0.42
C9-C10 Aromatics (unadj.)	0.0018 J	0.017 J	0.005 U	0.25 U	0.25 U	0.002 J	0.05 U
C9-C12 Aliphatics (unadj.)	0.0043 J	0.085 J	0.005 U	0.25 U	0.25 U	0.0045 J	0.19

Notes:
mg/L - milligrams per liter
U - analyte not detected,
value shown is reporting limit
J - value is estimated

Prepared by: KMS 6/18/19
Checked by: CTM 6/25/19

Table 3-3
Plant B Analytical Results for First Quarter 2019 Groundwater Sampling
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	GW-16R OC-GW-16R 3/30/2017
Volatile Organics (mg/L)	
2,4,4-Trimethyl-1-pentene	1.4
2,4,4-Trimethyl-2-pentene	0.45
Semivolatile Organics (mg/L)	
N-Nitrosodiphenylamine	0.14
Metals, Filtered (mg/L)	
Iron	2.1
Inorganics (mg/L)	
Nitrogen, as Ammonia	3.7
pH	7.0 J
Volatile Petroleum Hydrocarbons (mg/L)	
Toluene	0.0036 J
Xylene, o	0.017 J
C9-C12 Aliphatics	0.49 J
C5-C8 Aliphatics	2.0
C5-C8 Aliphatics (unadj.)	2.0
C9-C10 Aromatics (unadj.)	0.013 J
C9-C12 Aliphatics (unadj.)	0.52 J

Notes:
mg/L - milligrams per liter
U - analyte not detected,
value shown is reporting limit
B - Compound was found in the
blank and sample
J - value is estimated

Prepared by: KMS 6/18/19
Checked by: CTM 6/25/19

Table 3-4
Plant B Water Level and Product Recovery Data: October 2018 - December 2018 [1]
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Well	Depth to Water feet[2]			Depth to Product feet[2]			Product Thickness feet[3, 4]			Reference Elevation	Potentiometric Surface Elevation (feet NGVD) Corrected for Product [5]			Product Removed gallons		
ID	10/30/2018	11/27/2018	12/27/2018	10/30/2018	11/27/2018	12/27/2018	10/30/2018	11/27/2018	12/27/2018	feet	10/30/2018	11/27/2018	12/27/2018	10/30/2018	11/27/2018	12/27/2018
B-2	11.45	10.28	10.26	NPD	NPD	NPD	NA	NA	NA	90.48	79.03	80.20	80.22			
B-3	10.83	9.57	9.55	NPD	NPD	NPD	NA	NA	NA	90.32	79.49	80.75	80.77			
B-5R	11.17	9.21	9.23	NPD	NPD	NPD	NA	NA	NA	91.38	80.21	82.17	82.15			
B-7A	7.86	6.01	6.02	NPD	NPD	NPD	NA	NA	NA	88.81	80.95	82.80	82.79			
B-17	9.51	7.31	7.33	NPD	NPD	NPD	NA	NA	NA	91.55	82.04	84.24	84.22			
GW-13	11.24	10.37	10.36	NPD	NPD	NPD	NA	NA	NA	90.57	79.33	80.20	80.21			
GW-14	9.13	6.53	6.56	NPD	NPD	NPD	NA	NA	NA	88.70	79.57	82.17	82.14			
GW-15	8.81	5.83	5.81	NPD	NPD	NPD	NA	NA	NA	90.01	81.20	84.18	84.20			
GW-16R	10.89	8.61	8.58	NPD	NPD	NPD	NA	NA	NA	92.46	81.57	83.85	83.88			
GW-23	12.31	11.26	11.28	12.05	11.23	11.24	0.26	0.03	0.04	91.04	78.98	79.81	79.80			
GW-52S	8.78	5.83	5.84	NPD	NPD	NPD	NA	NA	NA	87.95	79.17	82.12	82.11			
GW-100	11.15	10.56	10.58	NPD	NPD	NPD	NA	NA	NA	90.15	79.00	79.59	79.57			
GW-101	11.13	10.48	10.49	NPD	NPD	NPD	NA	NA	NA	90.14	79.01	79.66	79.65			
GW-102	9.98	9.28	9.31	NPD	NPD	NPD	NA	NA	NA	89.00	79.02	79.72	79.69			
IW-1	11.19	10.03	10.04	NPD	NPD	NPD	NA	NA	NA	90.71	79.52	80.68	80.67			
IW-2	11.39	10.40	10.43	11.37	NPD	NPD	0.02	NA	NA	90.53	79.16	80.13	80.10			
IW-3	11.35	10.55	10.57	NPD	10.54	NPD	NA	0.01	NA	90.76	79.41	80.22	80.19			
IW-6	10.35	9.81	9.83	NPD	NPD	NPD	NA	NA	NA	89.15	78.80	79.34	79.32			
IW-7	11.04	10.44	10.45	NPD	NPD	NPD	NA	NA	NA	90.10	79.06	79.66	79.65			
IW-8	10.85	10.18	10.17	NPD	10.17	NPD	NA	0.01	NA	89.94	79.09	79.77	79.77			
IW-9	10.63	9.87	9.89	NPD	NPD	NPD	NA	NA	NA	89.78	79.15	79.91	79.89			
IW-10	11.30	10.41	10.42	NPD	NPD	NPD	NA	NA	NA	90.43	79.13	80.02	80.01			
IW-11	10.83	10.11	11.22	NPD	10.09	11.19	NA	0.02	0.03	89.92	79.09	79.83	78.73			
IW-12	11.31	10.69	11.22	NPD	NPD	NPD	NA	NA	NA	90.31	79.00	79.62	79.09			
IW-13	10.70	9.87	13.74	NPD	NPD	13.73	NA	NA	0.01	89.90	79.20	80.03	76.17			
PID	10.90	10.20	10.88	NPD	NPD	NPD	NA	NA	NA	89.97	79.07	79.77	79.09			
P5	11.26	11.77	11.25	11.25	11.75	11.24	0.01	0.02	0.01	90.45	79.20	78.70	79.21			
12-IN	10.45	9.66	9.67	NPD	9.66	9.67	NA	Trace	Trace	89.84	79.39	80.18	80.17			
											Recovered Product For Month			**0.04**	**0.00**	**0.00**

Notes:

NPD - No Product Detected; NA - Not Applicable;

1 - Groundwater measurements and product recovery data collected by Olin

2 - Measurement collected from top of PVC; if well does not have PVC casing, measurement taken from top of steel casing

3 - Collected using ORS brand oil/water interface probe

4 - Correction equation used: Reference elevation - (depth to water - (product thickness X 0.95))

Prepared by / Date: SAI 04/25/19
Checked by / Date: CTM 04/25/19

Table 3-5
Plant B Water Level and Product Recovery Data: January 2019 - March 2019 [1]
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Well	Depth to Water feet[2]			Depth to Product feet[2]			Product Thickness feet[3, 4]			Reference Elevation	Potentiometric Surface Elevation (feet NGVD) Corrected for Product [5]			Product Removed gallons		
ID	1/30/2019	2/26/2019	3/29/2019	1/30/2019	2/26/2019	3/29/2019	1/30/2019	2/26/2019	3/29/2019	feet	1/30/2019	2/26/2019	3/29/2019	1/30/2019	2/26/2019	3/29/2019
B-2	11.33	11.51	11.46	NPD	NPD	NPD	NA	NA	NA	90.48	79.15	78.97	79.02			
B-3	10.88	10.97	10.82	NPD	NPD	NPD	NA	NA	NA	90.32	79.44	79.35	79.50			
B-5R	11.08	11.21	11.13	NPD	NPD	NPD	NA	NA	NA	91.38	80.30	80.17	80.25			
B-7A	10.90	11.03	7.71	NPD	NPD	NPD	NA	NA	NA	88.81	77.91	77.78	81.10			
B-17	11.10	8.64	9.11	NPD	NPD	NPD	NA	NA	NA	91.55	80.45	82.91	82.44			
GW-13	11.07	11.20	11.15	NPD	NPD	NPD	NA	NA	NA	90.57	79.50	79.37	79.42			
GW-14	8.64	8.76	8.95	NPD	NPD	NPD	NA	NA	NA	88.70	80.06	79.94	79.75			
GW-15	7.91	8.07	8.22	NPD	NPD	NPD	NA	NA	NA	90.01	82.10	81.94	81.79			
GW-16R	10.40	10.53	10.52	NPD	NPD	NPD	NA	NA	NA	92.46	82.06	81.93	81.94			
GW-23	11.70	11.64	11.57	10.91	11.62	11.55	0.79	0.02	0.02	91.04	80.09	79.42	79.49			
GW-52S	8.95	9.04	8.24	NPD	NPD	NPD	NA	NA	NA	87.95	79.00	78.91	79.71			
GW-100	11.39	11.49	11.14	NPD	NPD	NPD	NA	NA	NA	90.15	78.76	78.66	79.01			
GW-101	11.38	11.50	11.14	NPD	NPD	NPD	NA	NA	NA	90.14	78.76	78.64	79.00			
GW-102	10.07	10.28	10.01	NPD	NPD	NPD	NA	NA	NA	89.00	78.93	78.72	78.99			
IW-1	11.37	11.43	11.23	NPD	NPD	NPD	NA	NA	NA	90.71	79.34	79.28	79.48			
IW-2	11.41	11.50	11.20	NPD	NPD	NPD	NA	NA	NA	90.53	79.12	79.03	79.33			
IW-3	11.67	11.75	11.35	NPD	NPD	NPD	NA	NA	NA	90.76	79.09	79.01	79.41			
IW-6	10.55	10.73	10.31	NPD	NPD	NPD	NA	NA	NA	89.15	78.60	78.42	78.84			
IW-7	11.47	11.67	11.03	NPD	NPD	NPD	NA	NA	NA	90.10	78.63	78.43	79.07			
IW-8	11.17	11.36	10.87	NPD	NPD	NPD	NA	NA	NA	89.94	78.77	78.58	79.07			
IW-9	10.91	11.04	10.63	NPD	NPD	NPD	NA	NA	NA	89.78	78.87	78.74	79.15			
IW-10	11.43	11.57	11.29	NPD	NPD	NPD	NA	NA	NA	90.43	79.00	78.86	79.14			
IW-11	10.88	13.30	10.89	10.86	13.23	NPD	0.02	0.07	NA	89.92	79.06	76.69	79.03			
IW-12	10.91	13.68	11.33	NPD	NPD	NPD	NA	NA	NA	90.31	79.40	76.63	78.98			
IW-13	19.57	18.56	10.68	19.57	NPD	NPD	Trace	NA	NA	89.90	70.33	71.34	79.22			
PID	11.29	11.07	10.89	NPD	NPD	NPD	NA	NA	NA	89.97	78.68	78.90	79.08			
P5	11.47	11.59	11.28	NPD	NPD	11.27	NA	NA	0.01	90.45	78.98	78.86	79.18			
12-IN	10.68	--	10.50	NPD	--	NPD	NA	--	NA	89.84	79.16	--	79.34			
											Recovered Product For Month			**0.01**	**0.03**	**0.02**

Notes:

NPD - No Product Detected; NA - Not Applicable

1 - Groundwater measurements and product recovery data collected by Olin

2 - Measurement collected from top of PVC; if well does not have PVC casing, measurement taken from top of steel casing

3 - Collected using ORS brand oil/water interface probe

4 - Correction equation used: Reference elevation - (depth to water - (product thickness X 0.95))

Prepared by / Date: SAM 04/25/19

Checked by / Date: CTM 04/25/19

Table 5-1
Private Well Analytical Results for the Fourth Quarter 2018
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-M01L6C 12/6/2018	OC-M01L6D 12/6/2018	OC-M02L07 12/6/2018	OC-M03L02 12/7/2018	OC-M03L2D 12/7/2018	OC-M03L2F 12/7/2018	OC-M03L07 12/6/2018	OC-M14L2B 12/6/2018	OC-M15L2C 12/7/2018	OC-M24L54 12/6/2018	OC-M24L63 12/6/2018	OC-M24L64 12/7/2018
NDMA												
N-Nitrosodimethylamine	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2.1 U	2 U	15	2 U	2.1 U
Metals, Total (mg/L)												
Chromium			0.01 U					0.01 U	0.01 U	0.00067 J	0.0015 J	0.01 U
Chromium, Hexavalent			0.01 U					0.01 U	0.0061 J	0.01 U	0.01 U	0.0073 J
Sodium			6.9					28	21	30	24	25
Inorganics (mg/L)												
Ammonia			0.12 J					0.2 U	0.11 J	0.2 U	0.19 J	0.12 J
Chloride			13					15	140	87	130	130
Nitrate as N			2.9					0.05 U	0.05 U	0.05 U	0.47	0.6
Sulfate			19					60	38	29	24	24

Notes:
mg/L - milligram per liter
ng/L = nanograms per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated
R - value is rejected

Table 5-1
Private Well Analytical Results for the Fourth Quarter 2018
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-M24L66 12/6/2018	OC-M24L72A 12/6/2018	OC-M24L94 12/6/2018
NDMA			
N-Nitrosodimethylamine	2.1 U	2 U	2.1 UJ
Metals, Total (mg/L)			
Chromium	0.01 U	0.00077 J	0.0014 J
Chromium, Hexavalent			0.01 U
Sodium	2.6 J	20	49
Inorganics (mg/L)			
Ammonia	0.13 J	0.2 U	0.2 U
Chloride	3.7	120	88
Nitrate as N	0.05 U	0.6	1.2
Sulfate	12	22	21

Notes:
mg/L - milligram per liter
ng/L = nanograms per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated
R - value is rejected

Prepared by: KMS 6/18/19
Checked by: CTM 6/27/19

Table 5-2
Private Well Analytical Results for the First Quarter 2019
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-M01L6C 3/21/2019	OC-M01L6D 3/21/2019	OC-M02L07 3/21/2019	OC-M03L02 3/21/2019	OC-M03L2D 3/21/2019	OC-M03L2F 3/21/2019	OC-M03L07 3/21/2019	OC-M03L07 4/12/2019	OC-M14L2B 3/21/2019	OC-M15L2C 3/22/2019
NDMA/NDPA (ng/L)										
N-Nitrosodimethylamine	0.55 J	3.6	0.34 J	2 U	2 U	2 U	20	2 U	2.1 UJ	2 U
Metals, Total (mg/L)										
Sodium			8.8						26	26
Chromium			0.0011 J						0.01 U	0.00091 J
Inorganics (mg/L)										
Chloride			20						16	140
Nitrate as N			5.7						0.05 U	
Ammonia as Nitrogen			0.2 U						0.2 U	0.12 J
Sulfate			18						49	27

Notes:
mg/L - milligram per liter
ng/L - nanograms per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated

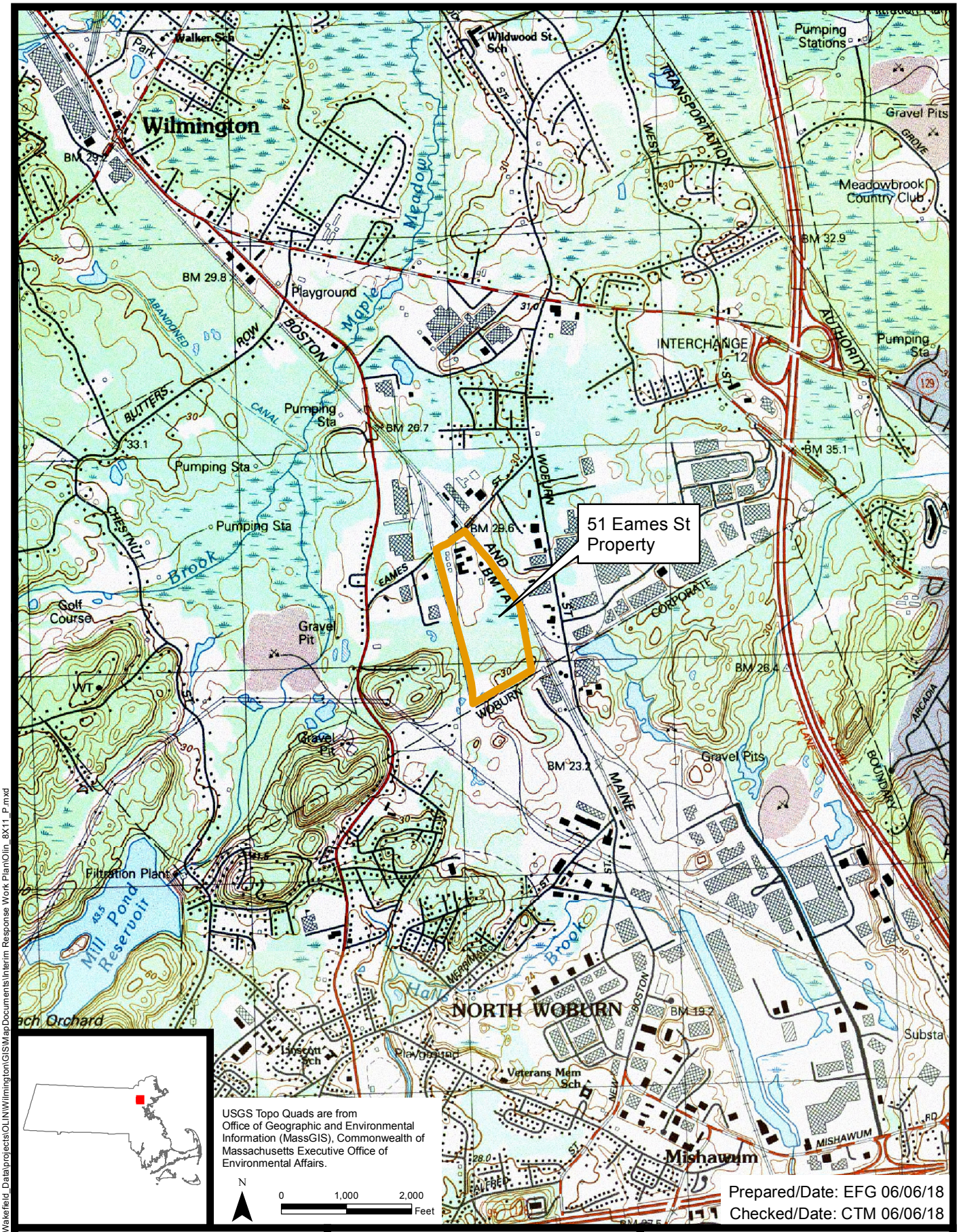
Table 5-2
Private Well Analytical Results for the First Quarter 2019
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-M24L54 3/22/2019	OC-M24L63 3/22/2019	OC-M24L64 3/22/2019	OC-M24L66 3/22/2019	OC-M24L94 3/22/2019
NDMA/NDPA (ng/L)					
N-Nitrosodimethylamine	9.5	2 U	2 U	2 U	2 U
Metals, Total (mg/L)					
Sodium	31	20	20	1.9 J	28
Chromium	0.01 U	0.00072 J	0.00065 J	0.01 U	0.01 U
Inorganics (mg/L)					
Chloride	82	120	120	2.5	110
Nitrate as N					
Ammonia as Nitrogen	0.42 U	0.23 U	0.2 U	0.2 U	0.22 U
Sulfate	25	20	20	8.3	19

Notes:
mg/L - milligram per liter
ng/L - nanograms per liter
U - analyte not detected,
value shown is detection limit
J - value is estimated

Prepared by: KMS 6/20/19
Checked by: CTM 6/27/19

Figures

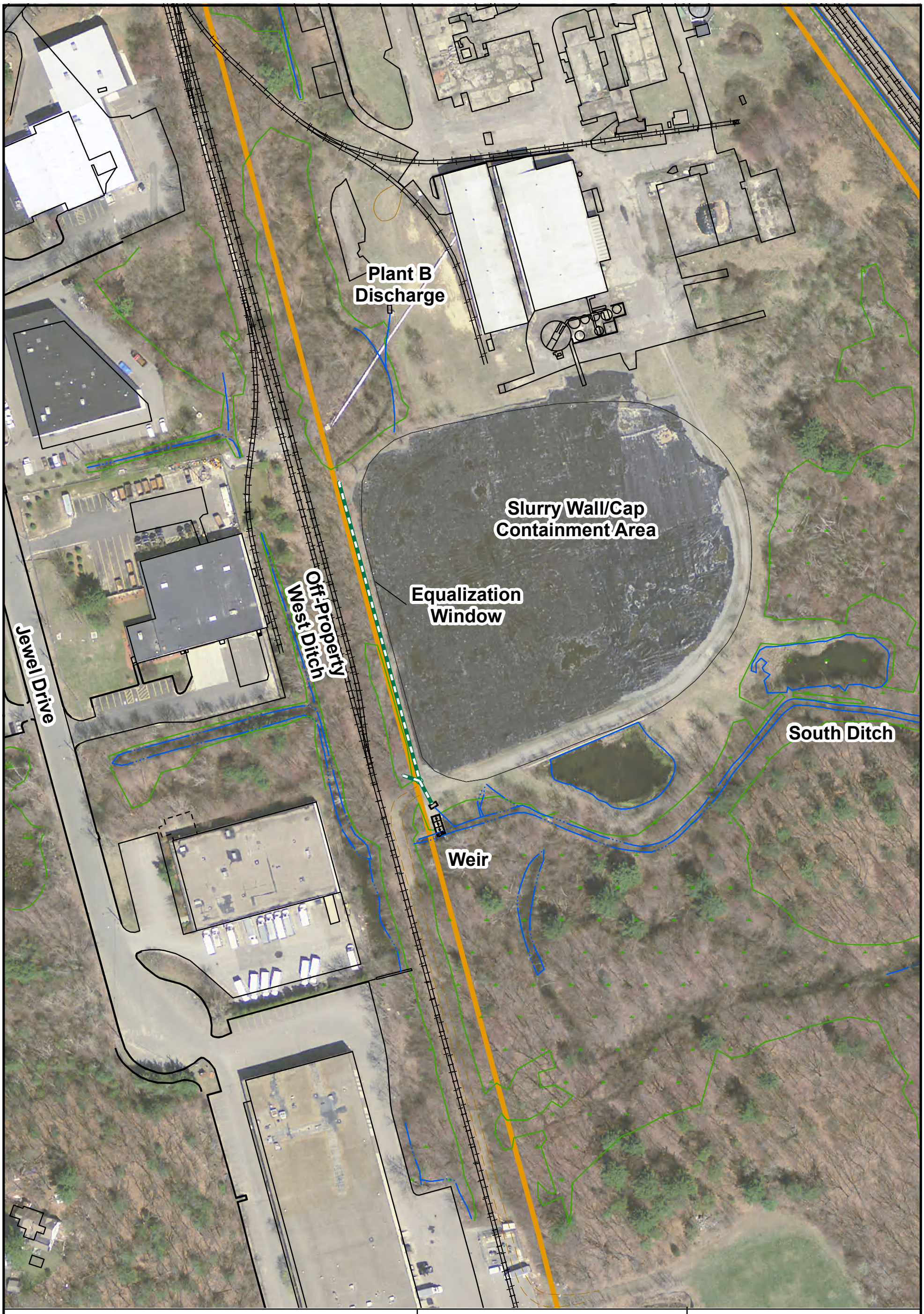


Olin Chemical Superfund Site
Wilmington, Massachusetts

wood.

Figure 1-1
Site Location
Semi-Annual Status Report No. 24

Document: P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_8X11_P.mxd



Legend

- Railroad
- Water
- Culvert
- Site Boundary
- Wetland Boundary
- Paved Road
- Unpaved Road
- Railroad
- Structure
- Water
- Culvert
- Trail

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

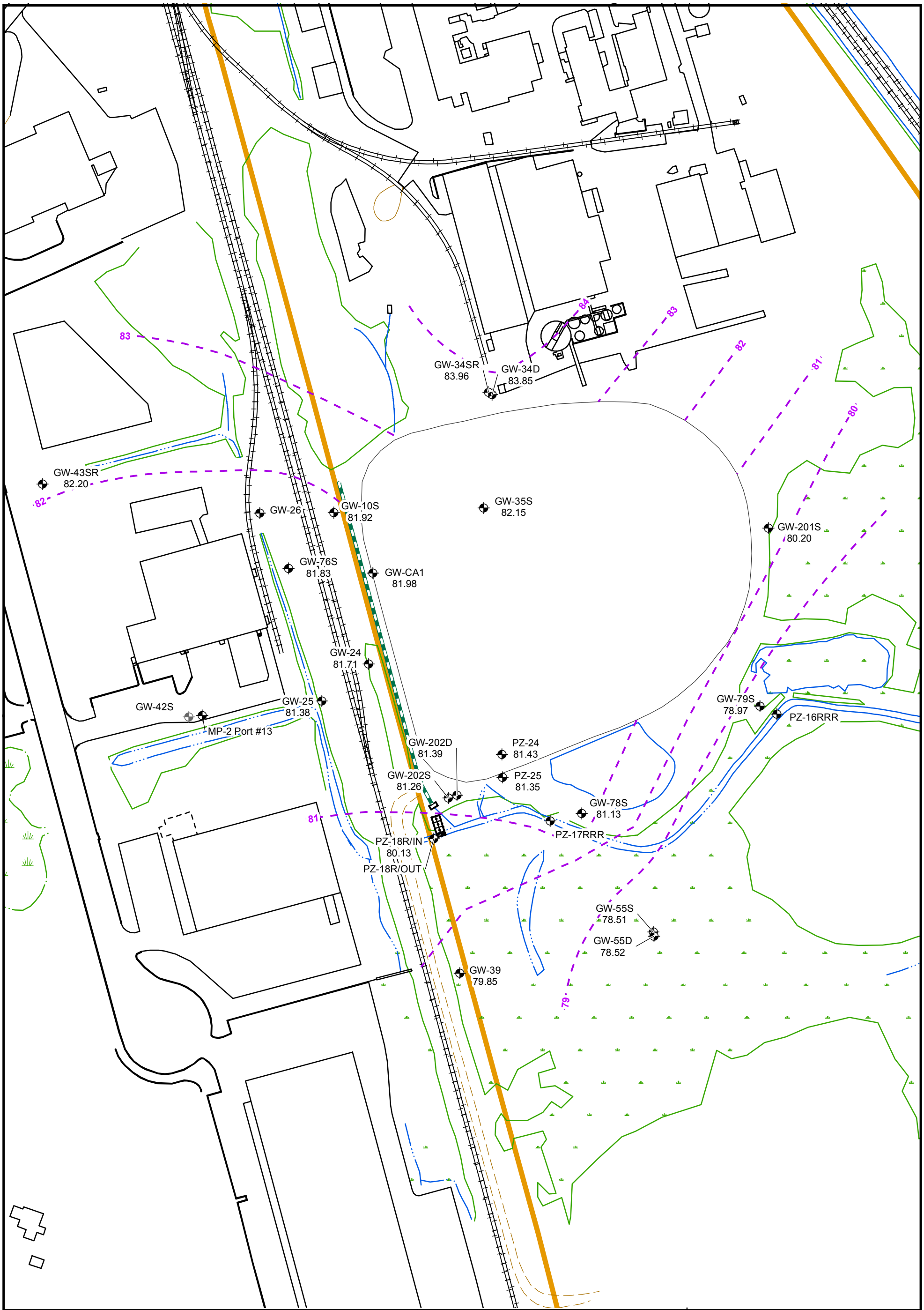
0 60 120 240 Feet

Figure 1-2
Site Plan

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/06/18 | Checked/Date: CTM 06/06/18

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd June 06, 2018 DWN: emily.gardiner CHKD: AKN



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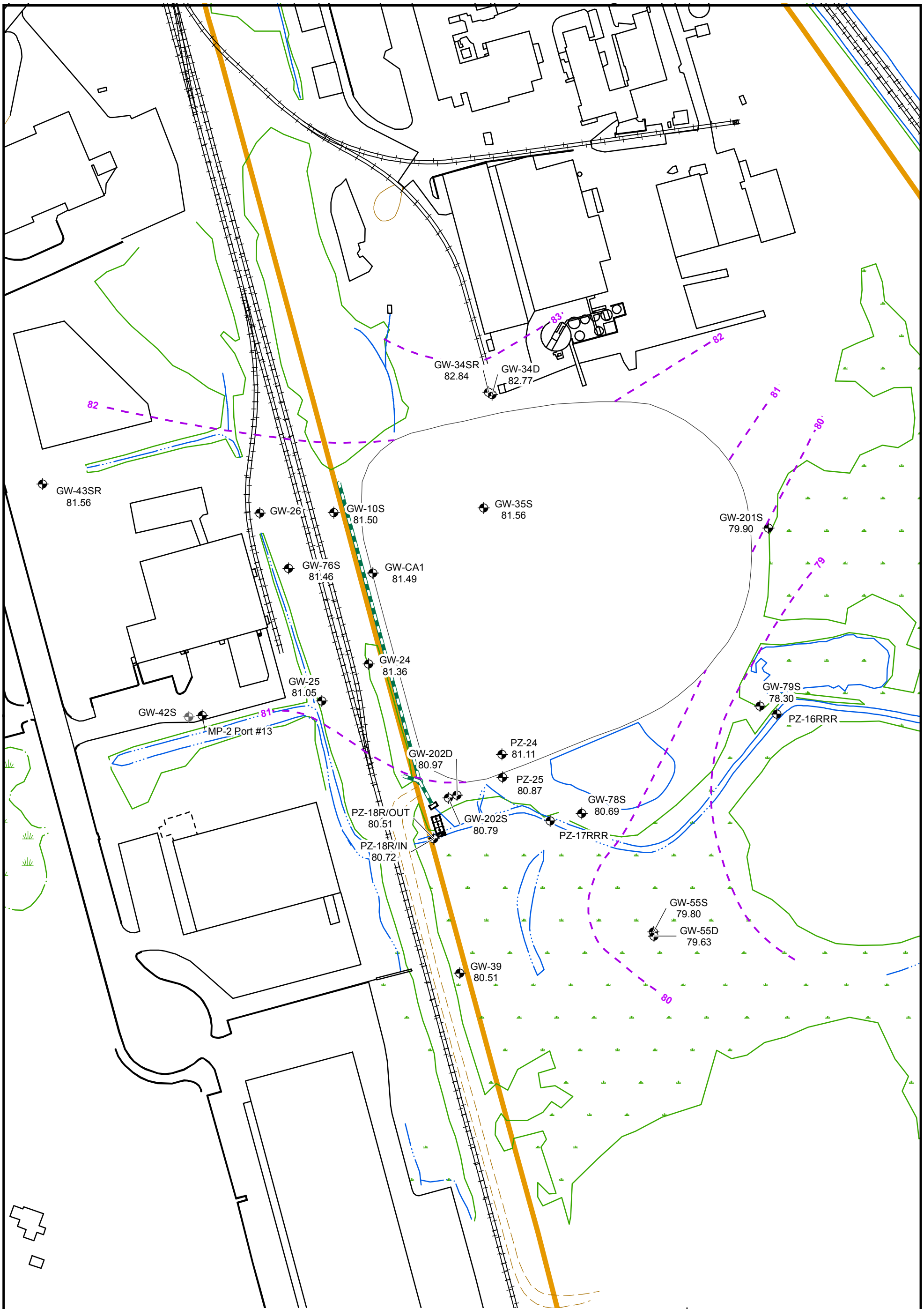

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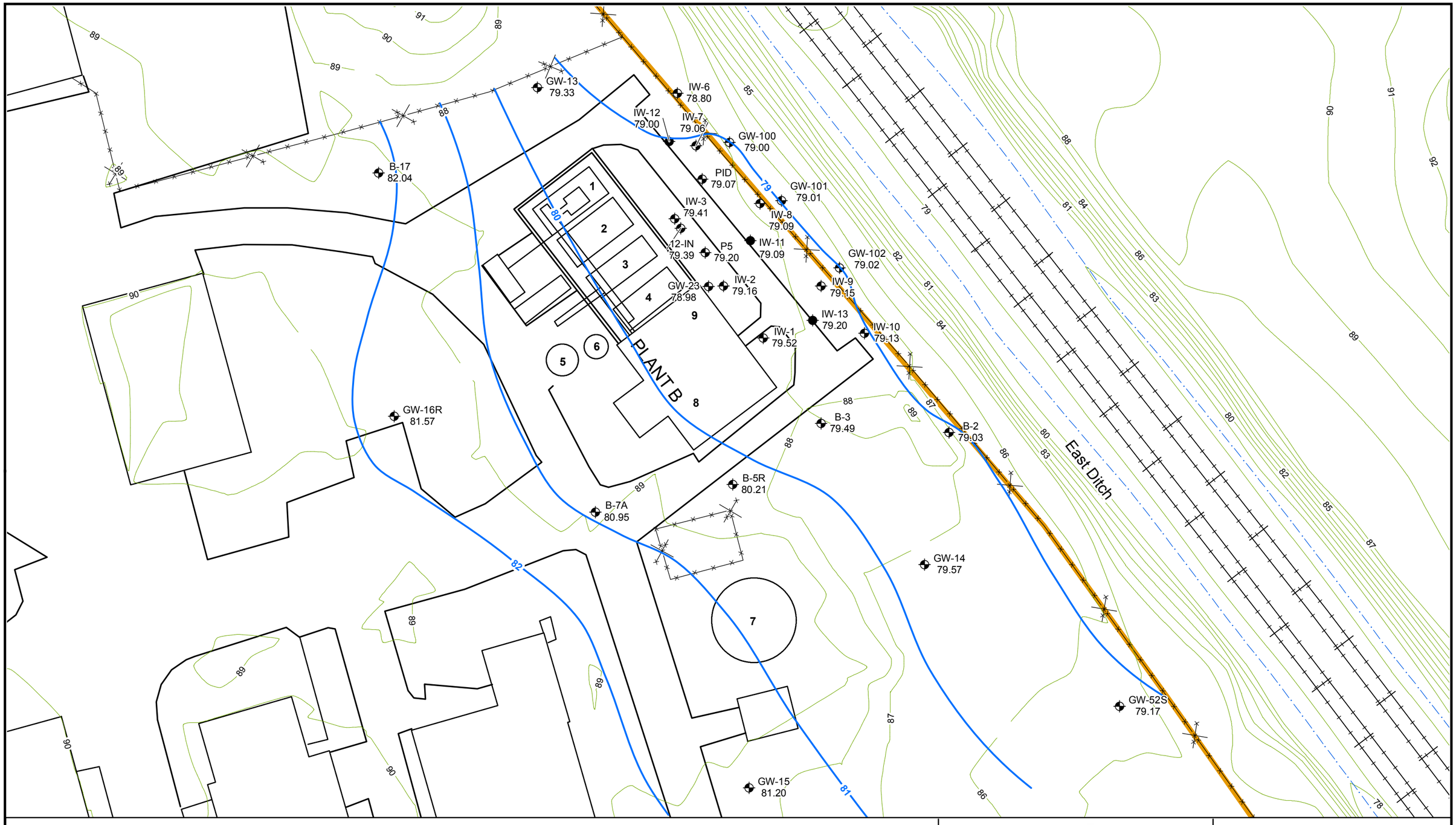
Figure 2-2
Slurry Wall / Cap Interpreted Water Level Contours - First Quarter 2019

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 07/02/19 | Checked/Date: CTM 07/02/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd July 02, 2019 DWN: emily.gardiner CHKD: AKN



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

wood.
Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

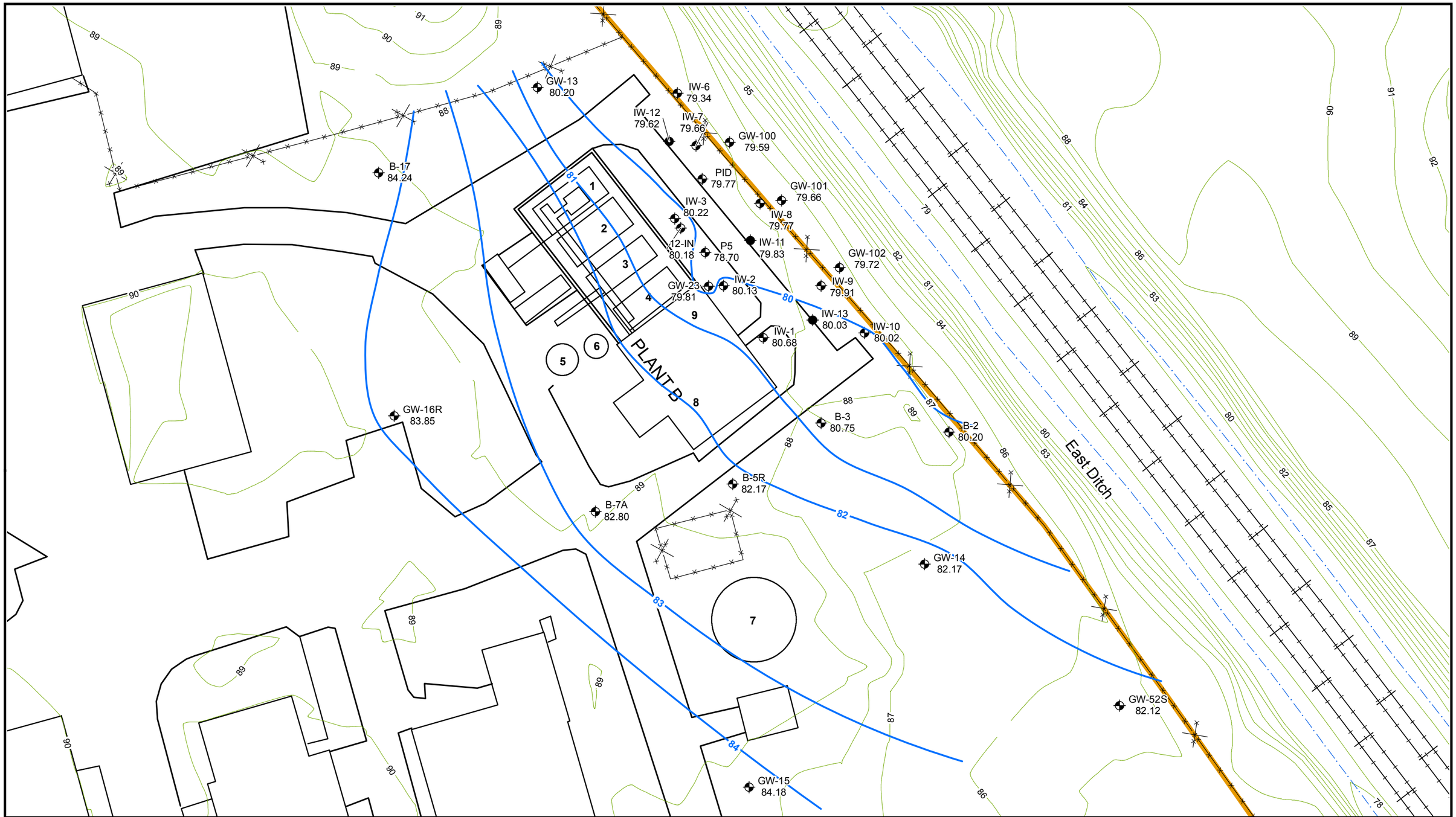
0 15 30 60 Feet

Figure 3-1
Plant B Interpreted Water Level Conditions - October 30, 2018

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 07/01/19 | Checked/Date: CTM 07/01/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18_19.mxd July 01, 2019 DWN: emily.gardiner CHKD: CTM



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

wood.
Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-2
Plant B Interpreted Water Level Conditions - November 27, 2018

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/28/19 | Checked/Date: CTM 06/28/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18_19.mxd June 28, 2019 DWN: emily.gardiner CHKD: CTM

GW-13
80.21
IW-6
79.32
IW-12
79.09
IW-7
79.65
GW-100
79.57
B-17
84.22
PID
79.09
GW-101
79.65
IW-3
80.19
IW-8
79.77
12-IN
80.17
P5
79.21
IW-11
78.73
GW-102
79.69
GW-23
79.80
IW-2
80.10
IW-9
79.89
IW-13
76.17
IW-10
80.01
IW-1
80.67
PLANT B
GW-16R
83.88
B-3
80.77
B-2
80.22
East Ditch
B-5R
82.15
B-7A
82.79
GW-14
82.14
GW-52S
82.11
GW-15
84.20

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

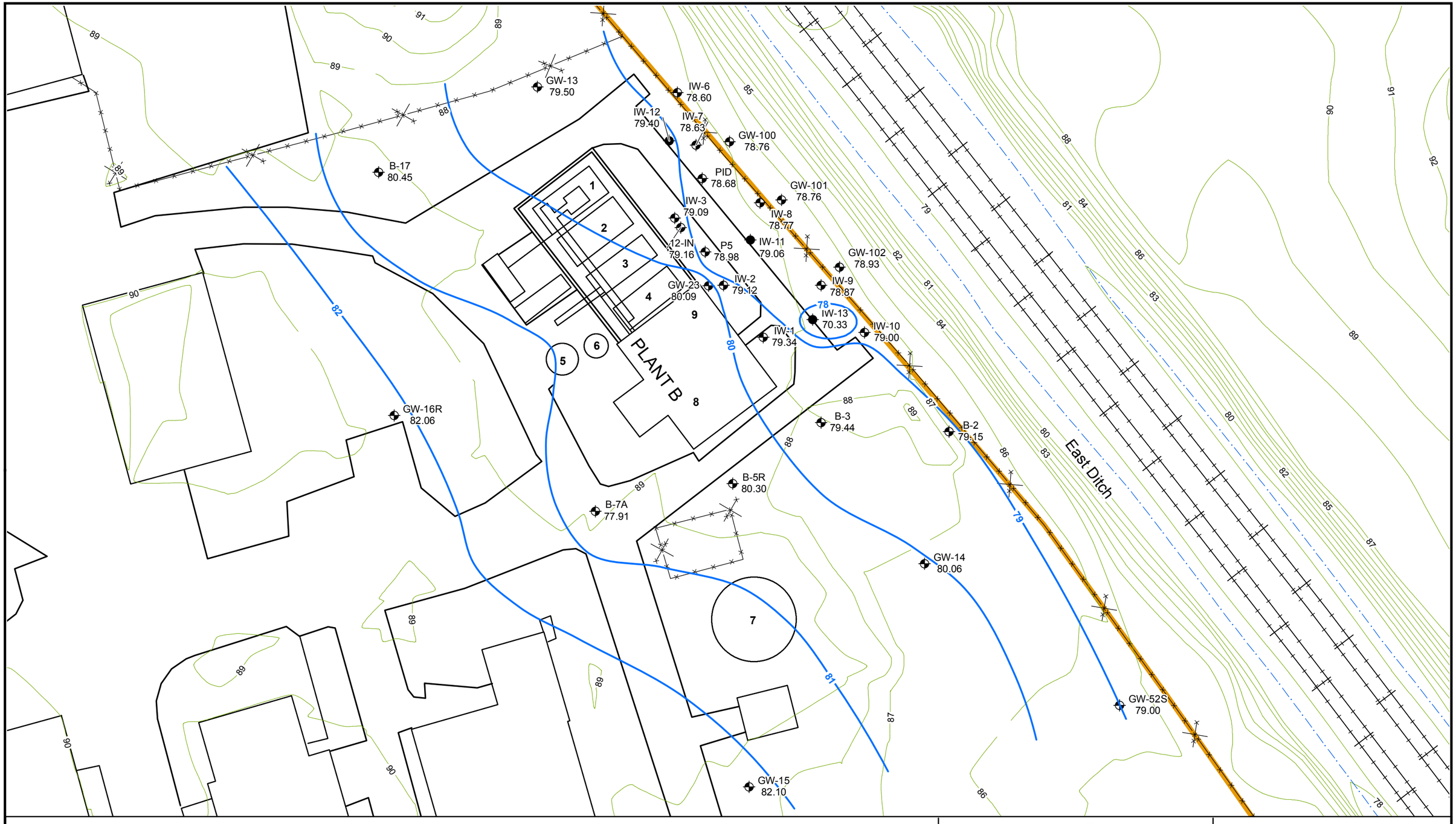
0 15 30 60 Feet

Figure 3-3
Plant B Interpreted Water Level Conditions - December 27, 2018

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/28/19 | Checked/Date: CTM 06/28/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18_19.mxd June 28, 2019 DWN: emily.gardiner CHKD: CTM



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

wood.
Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

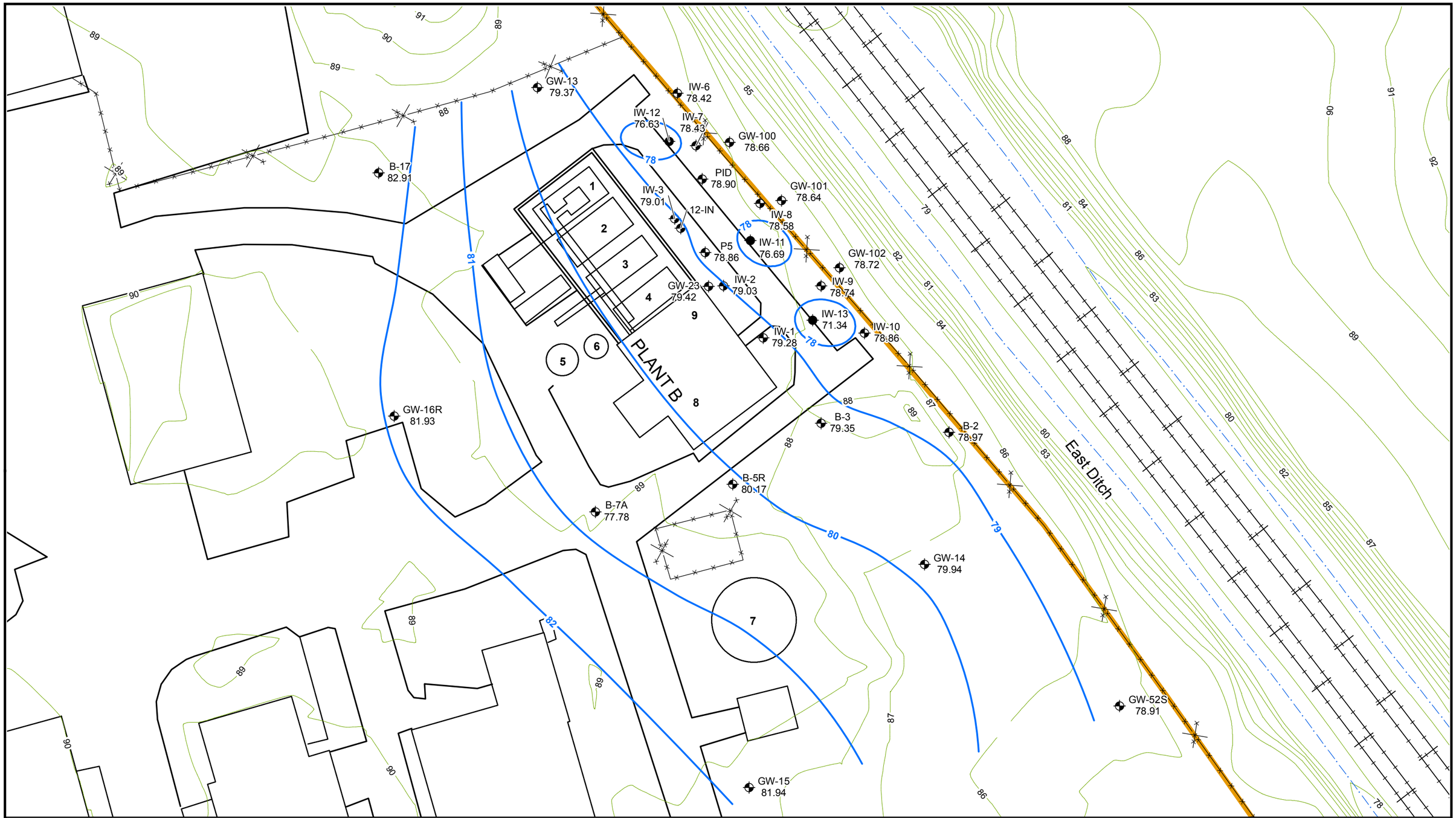
0 15 30 60 Feet

Figure 3-4
Plant B Interpreted Water Level Conditions - January 30, 2019

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 07/01/19 | Checked/Date: CTM 07/01/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18_19.mxd July 01, 2019 DWN: emily.gardiner CHKD: CTM



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

wood.
Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

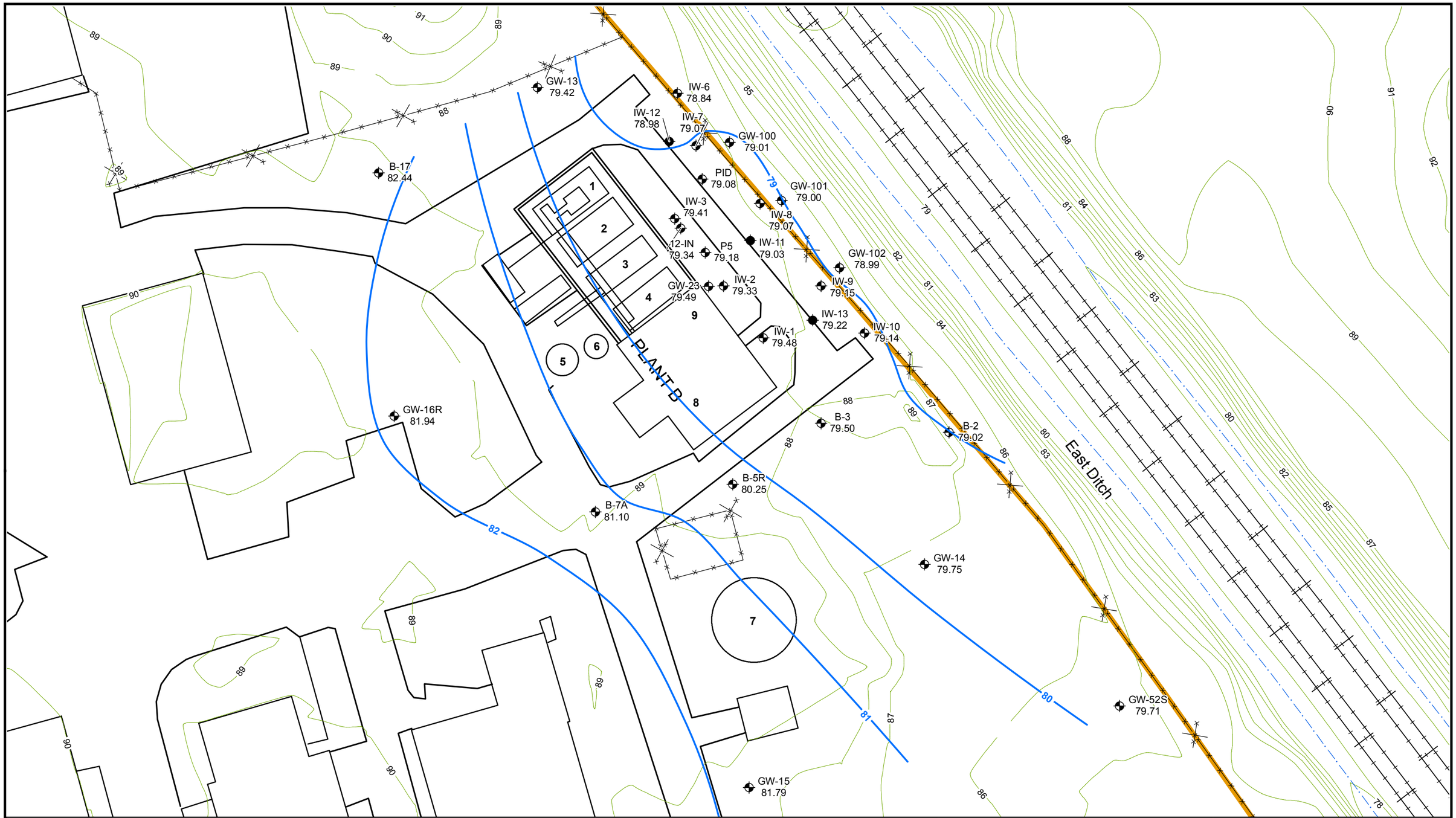
0 15 30 60 Feet

Figure 3-5
Plant B Interpreted Water Level Conditions - February 26, 2019

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/28/19 | Checked/Date: CTM 06/28/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18_19.mxd June 28, 2019 DWN: emily.gardiner CHKD: CTM



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

wood.

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

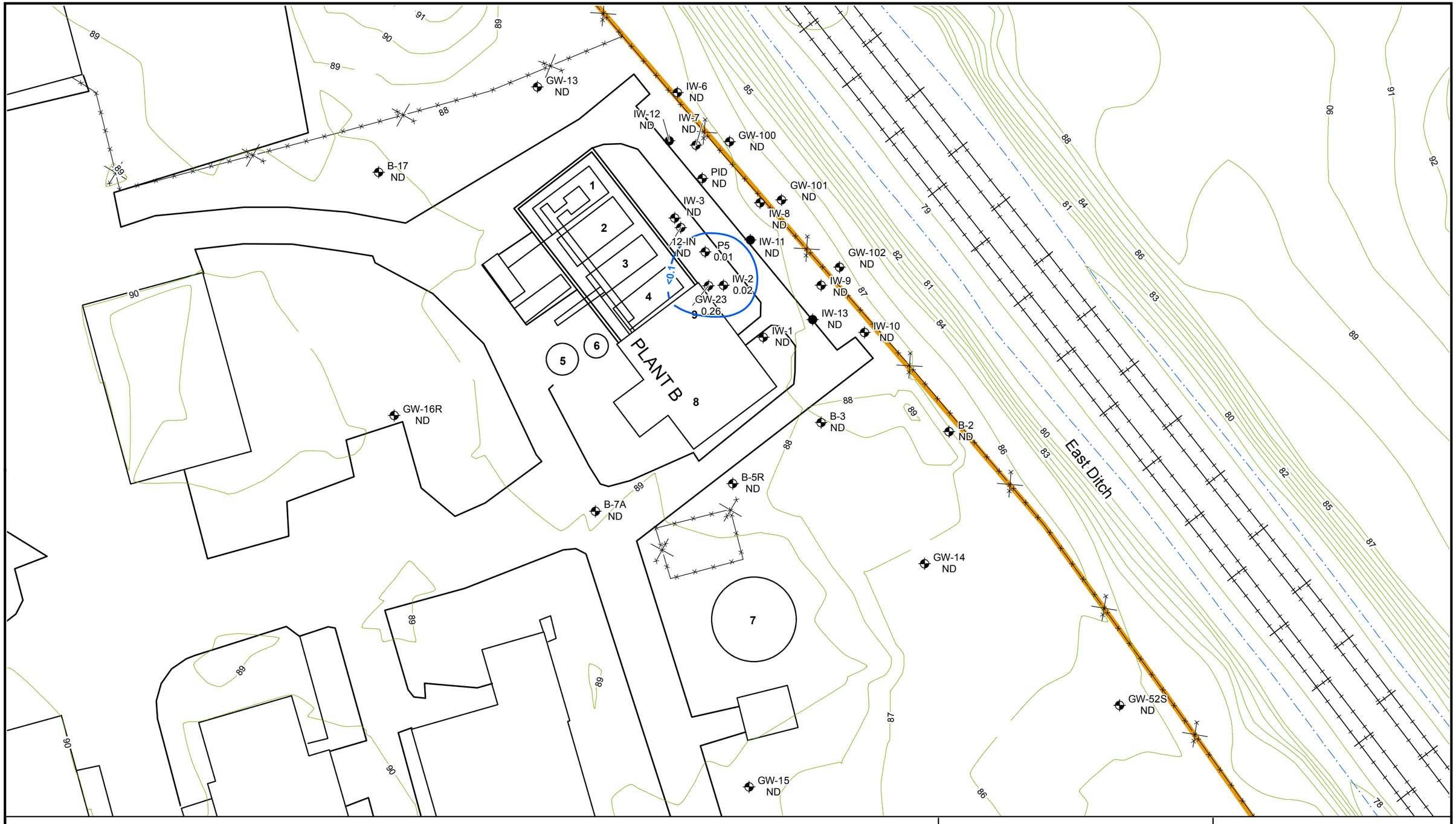
0 15 30 60 Feet

Figure 3-6
Plant B Interpreted Water Level Conditions - March 29, 2019

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/28/19 | Checked/Date: CTM 06/28/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18_19.mxd June 28, 2019 DWN: emily.gardiner CHKD: CTM



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

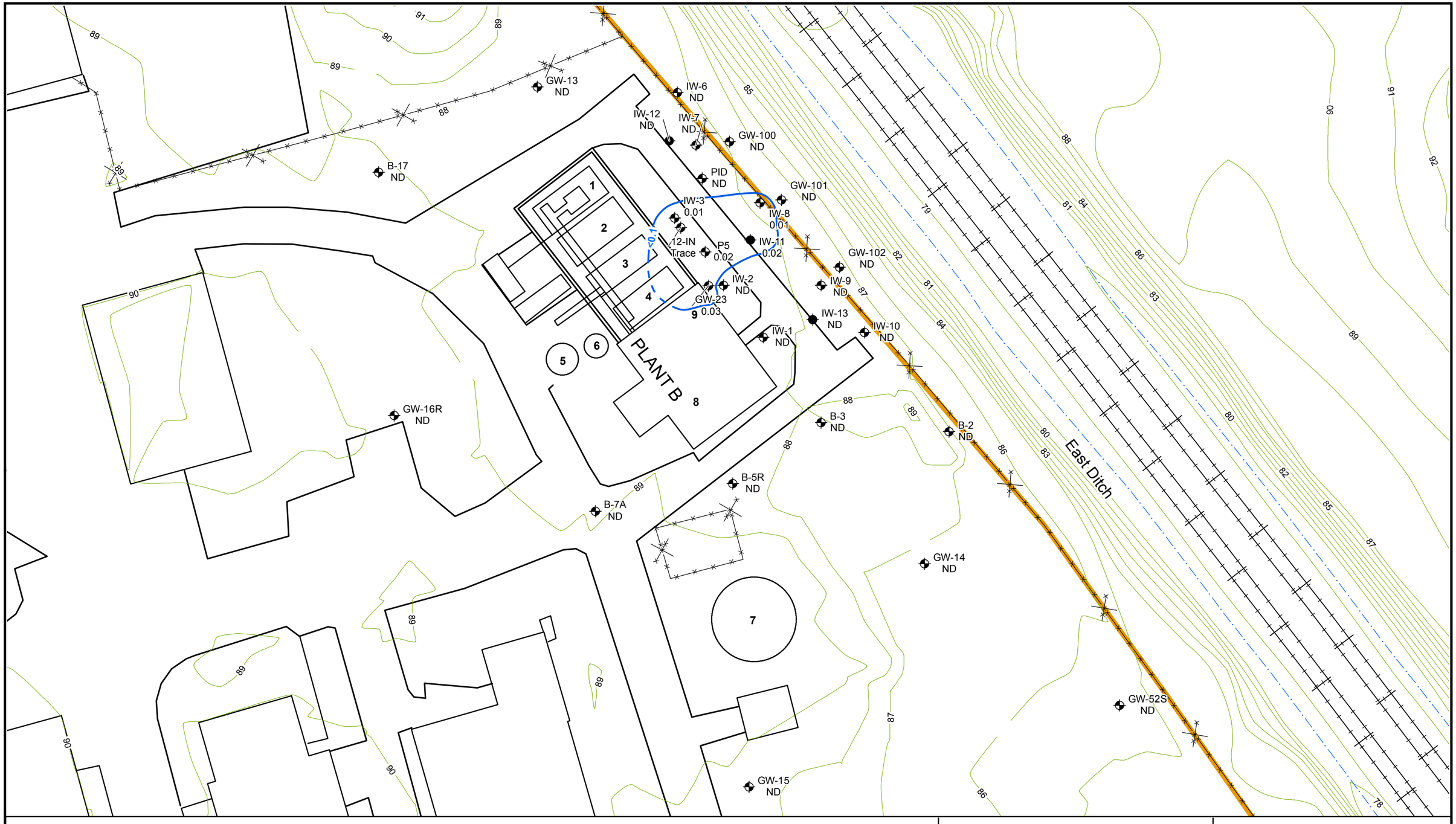
0 15 30 60 Feet

Figure 3-7
Plant B Interpreted LNAPL Thickness Contours - October 30, 2018

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/28/19 | Checked/Date: CTM 06/28/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18_19.mxd June 28, 2019 DWN: emily.gardiner CHKD: CTM



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

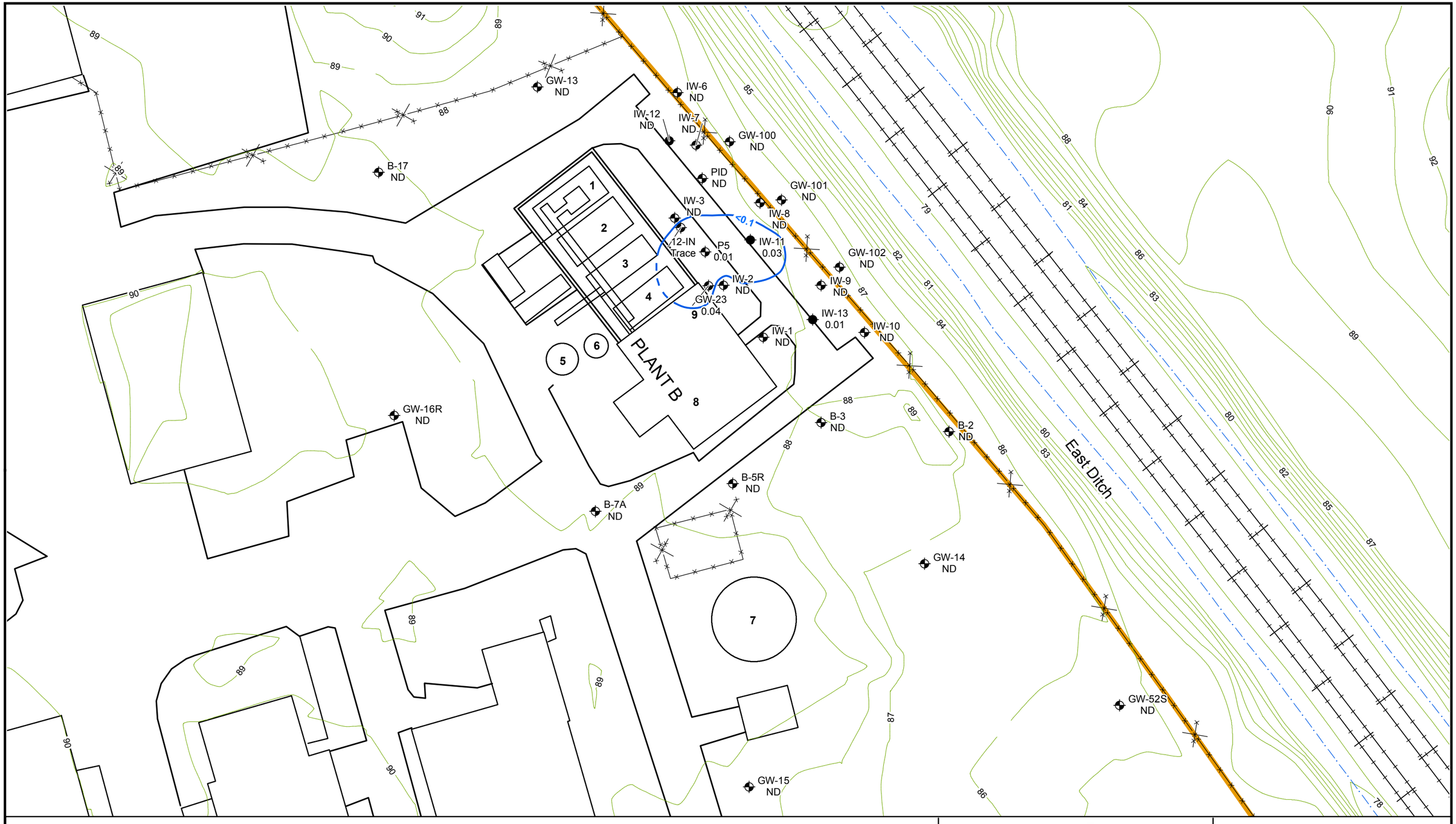
0 15 30 60 Feet

Figure 3-8
Plant B Interpreted LNAPL Thickness Contours - November 27, 2018

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/28/19 | Checked/Date: CTM 06/28/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18_19.mxd June 28, 2019 DWN: emily.gardiner CHKD: CTM



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

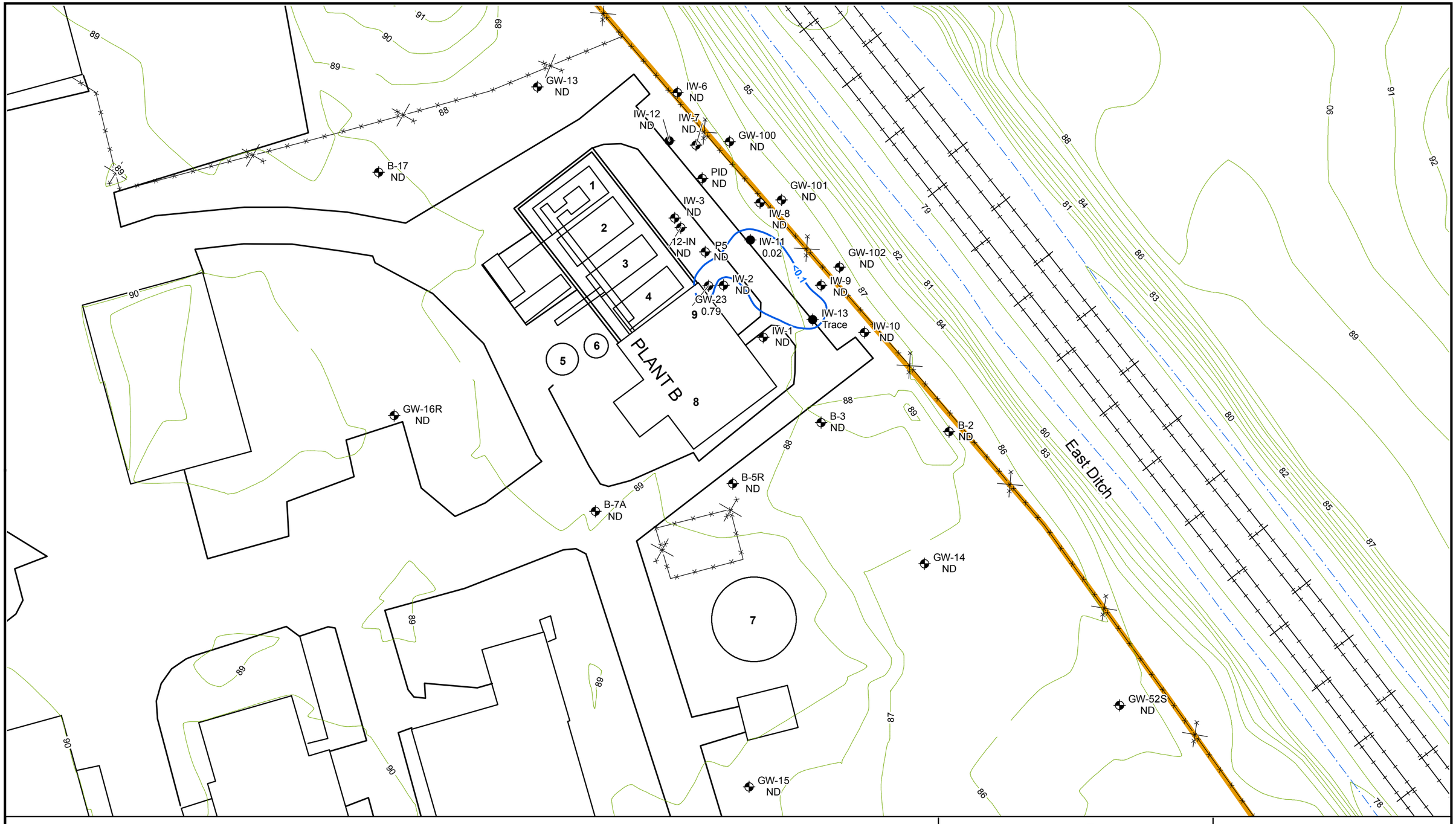
0 15 30 60 Feet

Figure 3-9
Plant B Interpreted LNAPL Thickness Contours - December 27, 2018

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/28/19 | Checked/Date: CTM 06/28/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18_19.mxd June 28, 2019 DWN: emily.gardiner CHKD: CTM



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

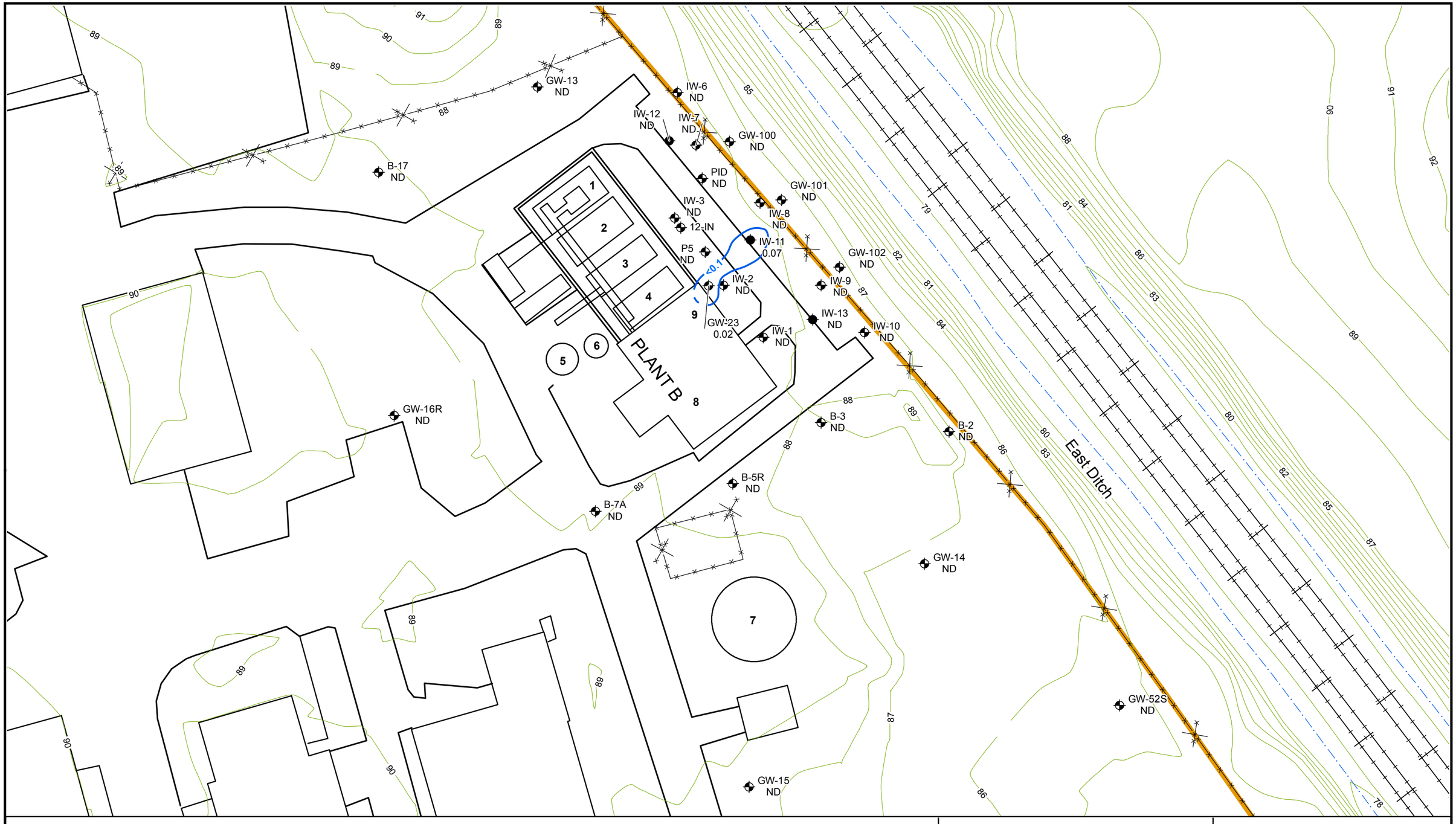
0 15 30 60 Feet

Figure 3-10
Plant B Interpreted LNAPL Thickness Contours - January 30, 2019

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/28/19 | Checked/Date: CTM 06/28/19

P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_SASR_18_19.mxd June 28, 2019 DWN: emily.gardiner CHKD: CTM



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-11
Plant B Interpreted LNAPL Thickness Contours - February 26, 2019

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 07/01/19 | Checked/Date: CTM 07/01/19

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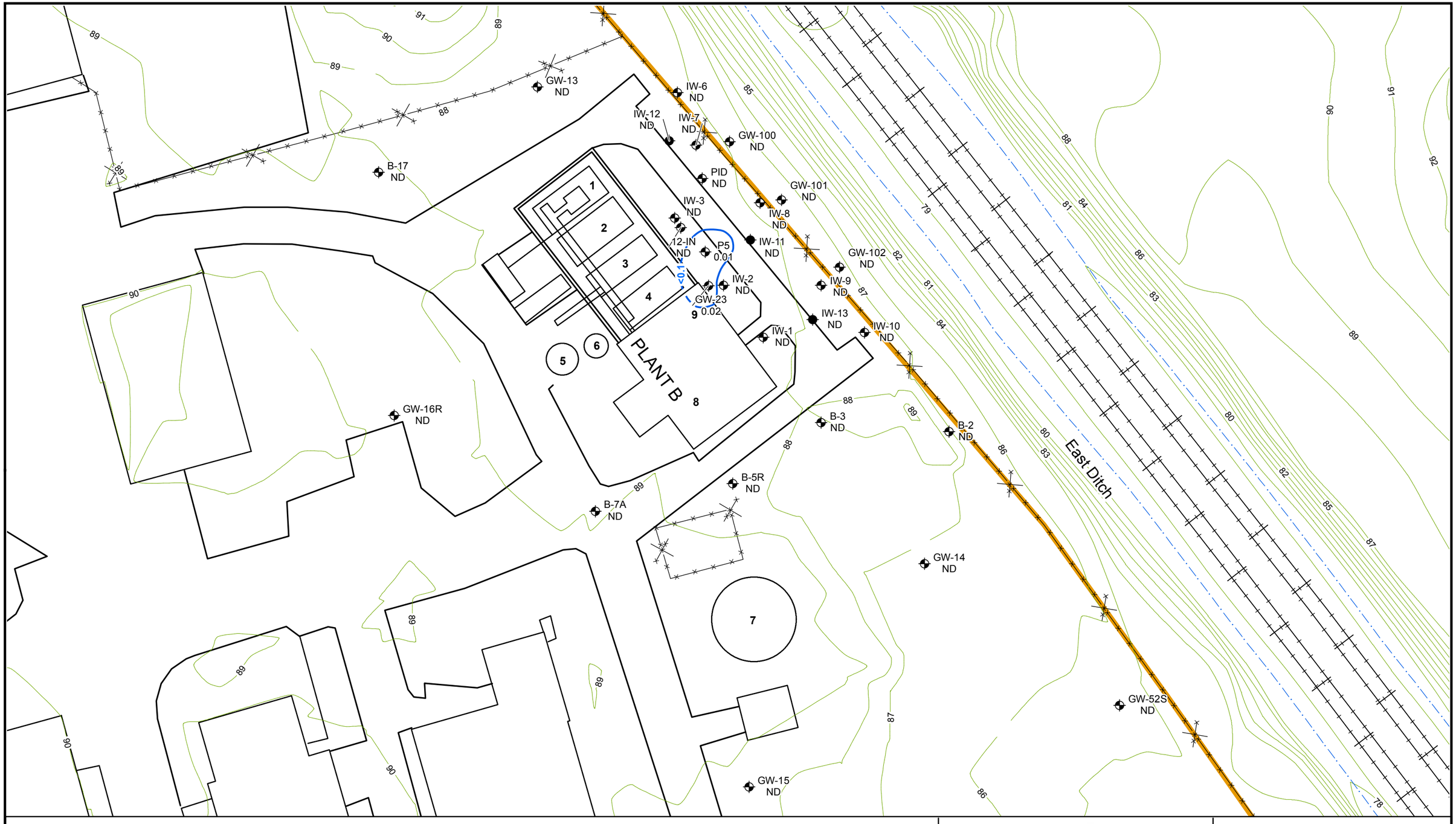

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPL Thickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 3-12
Plant B Interpreted LNAPL Thickness Contours - March 29, 2019

Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/28/19 | Checked/Date: CTM 06/28/19

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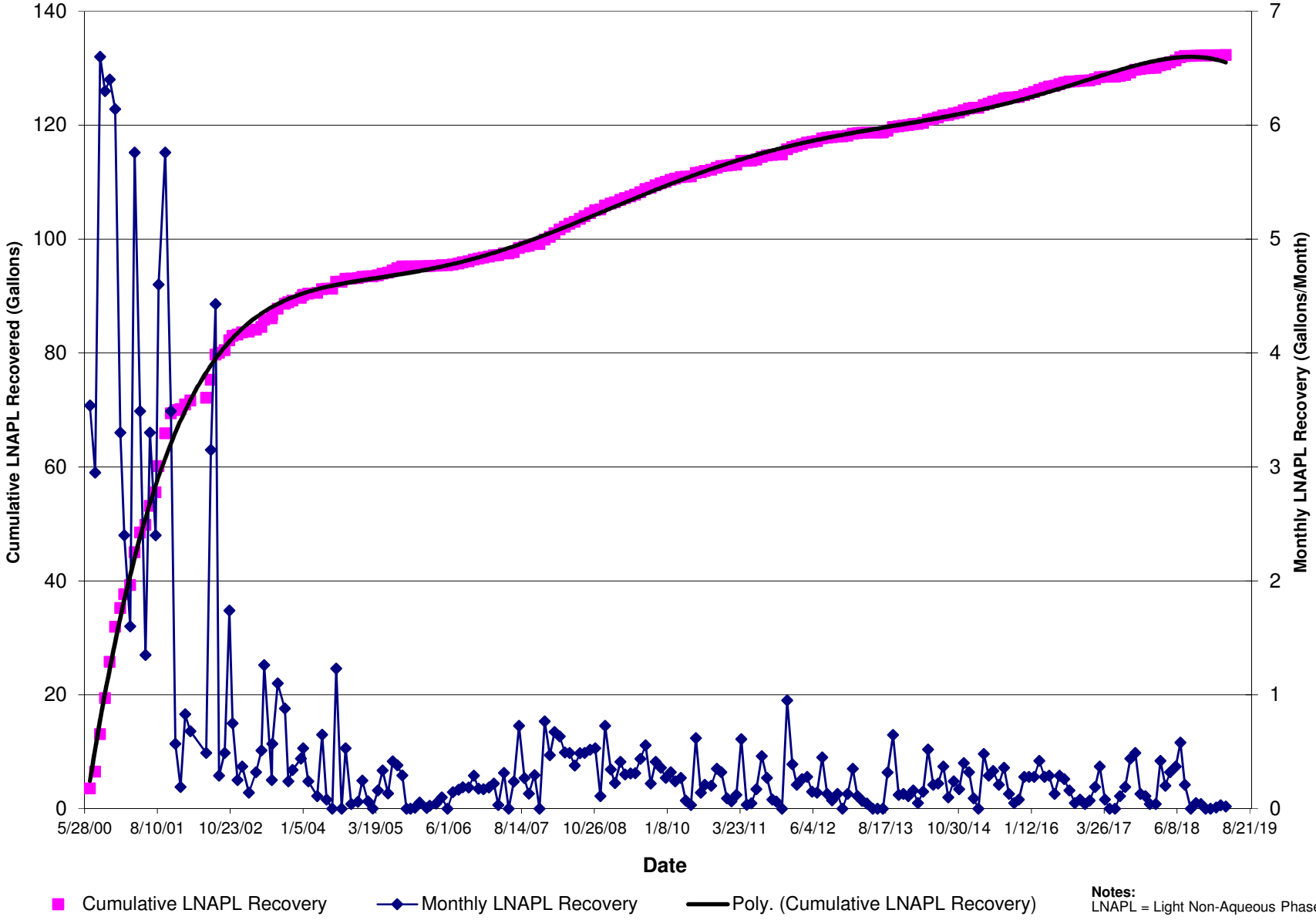
Figure 3-13
Monthly and Cumulative LNAPL Recovery
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts



Notes:
LNAPL = Light Non-Aqueous Phase Liquid

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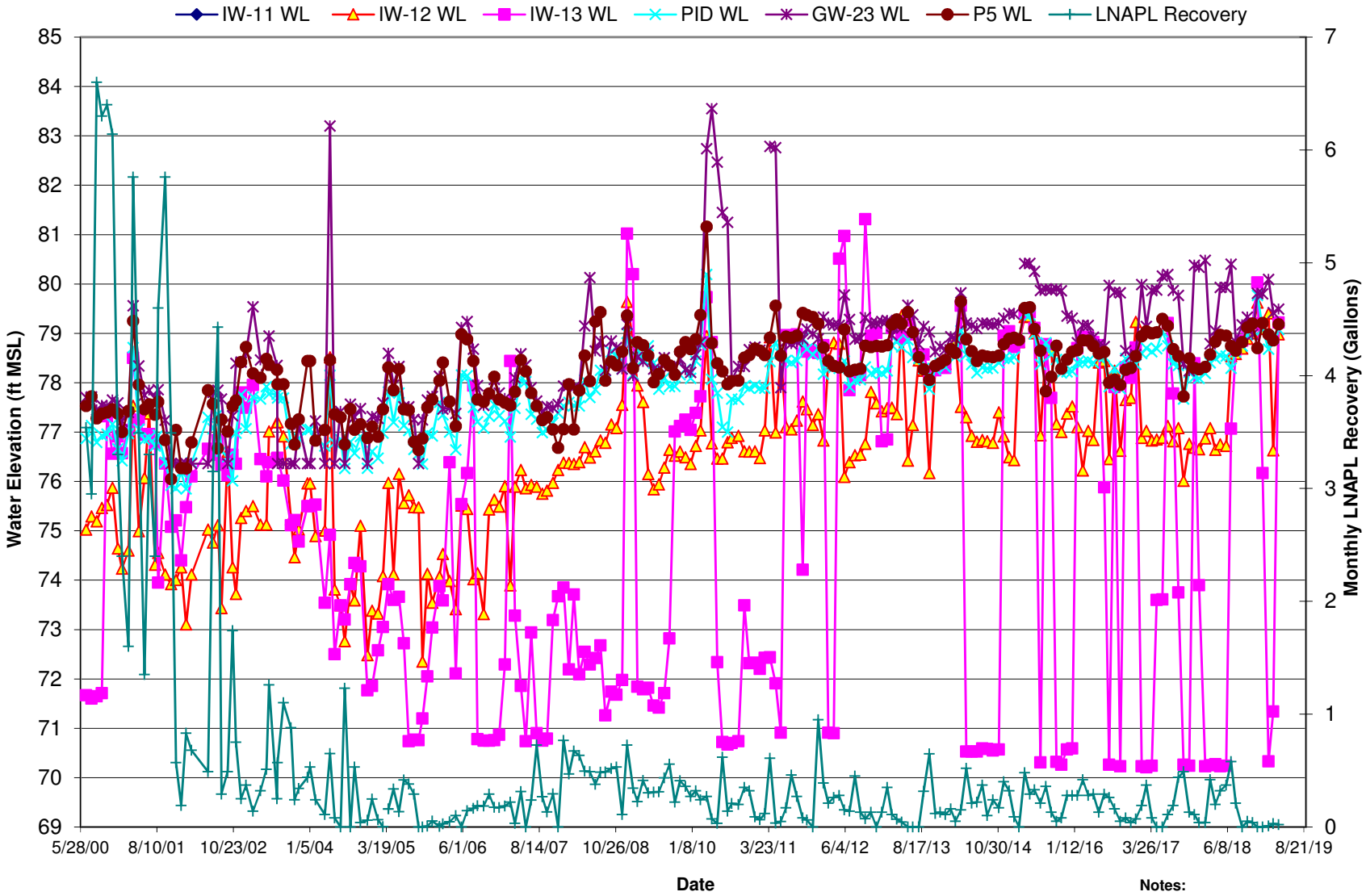
Monthy and Cumulative LNAPL Recovery Data Plot.xls, Figure 3-13

Prepared by / Date: SAM 6/26/2019
Checked by / Date: CTM 6/26/2019

Figure 3-14
Water Levels (WL) and Monthly LNAPL Recovery
Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts



Notes:
LNAPL = Light Non-Aqueous Phase Liquid

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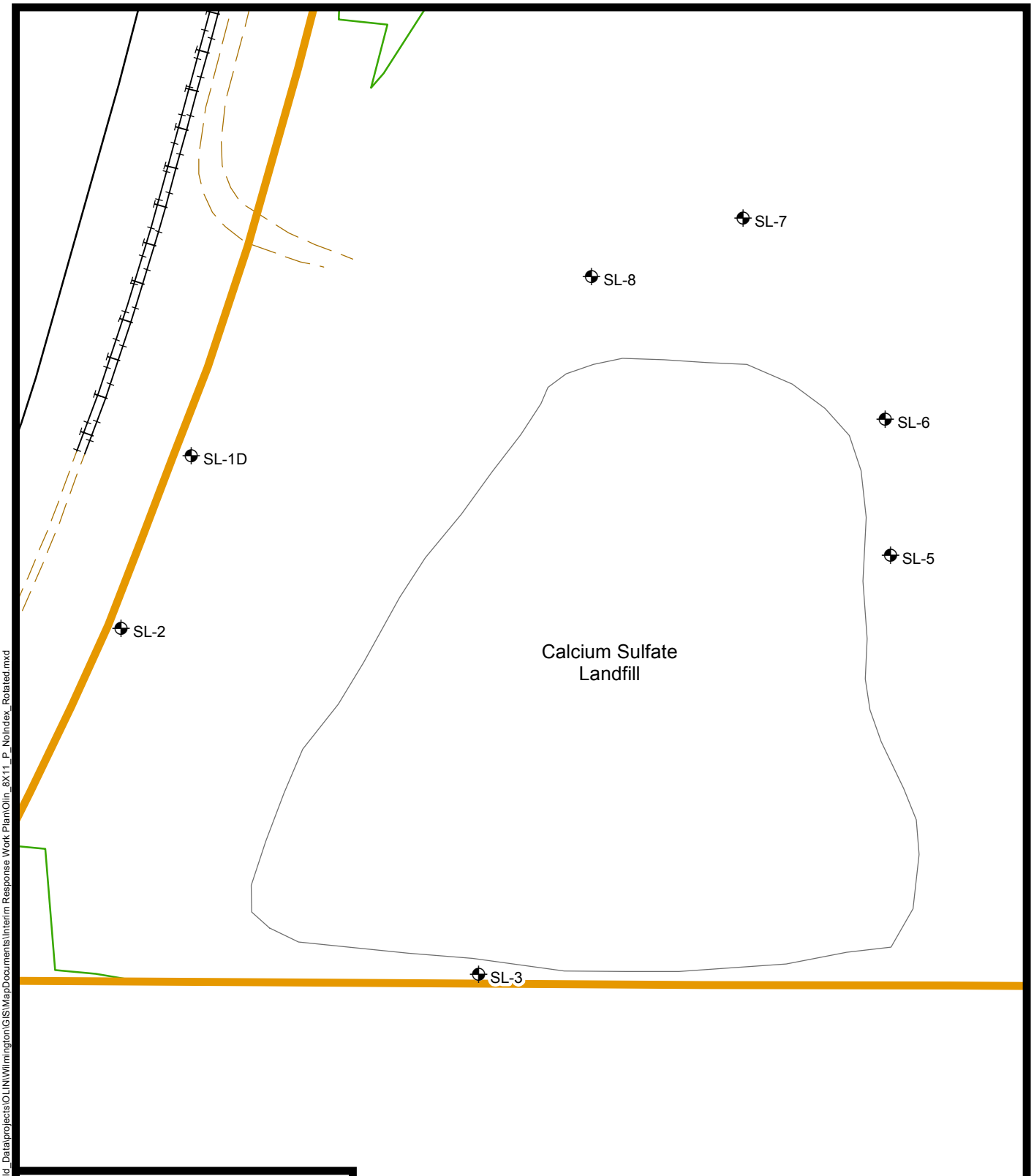
Monthy and Cumulative LNAPL Recovery Data Plot.xls, Figure 3-14

Prepared by / Date: SAM 6/26/2019
Checked by / Date: CTM 6/26/2019



Legend

- Groundwater Monitoring Location
- 51 Eames St. Property Boundary
- Railroad
- Structures
- Surface Water
- Wetland Boundary

N

0 40 80 Feet

Prepared/Date: EFG 06/13/18
Checked/Date: CTM 06/13/18

wood.

Figure 5-1
Calcium Sulfate Landfill
Monitoring Locations

Document: \\WFD-FS1\projectfi$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_8X11_P_NoIndex_Rotated.mxd

Appendix A

Interim Response Steps Field Activity Reports

Appendix A1

Fourth Quarter 2018 Sampling Event

Interim Response Steps Field Activity Report Fourth Quarter 2018 Sampling Event

Olin Chemical Superfund Site
Wilmington, Massachusetts
Project 6107190016

Prepared for:

Olin Corporation
3855 North Ocoee St., Suite 200, Cleveland, TN 37312

1-Jul-19

Interim Response Steps Field Activity Report
Fourth Quarter 2018 Sampling Event

Olin Chemical Superfund Site
Wilmington, Massachusetts

Project 6107190016

Prepared for:
Olin Corporation
3855 North Ocoee St., Suite 200, Cleveland, TN 37312

Prepared by:
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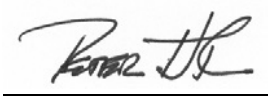
Chelmsford, MA 01824
USA
T: 978-692-9090

1-Jul-19

Prepared and Reviewed by:



Peter H. Thompson
Senior Principal Hydrogeologist

Michael J. Murphy
Principal Scientist

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List of acronyms

Amec Foster Wheeler	Amec Foster Wheeler Environment and Infrastructure, Inc.
DO	Dissolved Oxygen
IRSWP	Interim Response Steps Work Plan
LNAPL	Light Non-Aqueous Phase Liquid

MACTEC	MACTEC Engineering and Consulting, Inc.
NTU	Nephelometric Turbidity Units
ORP	Oxidation/Reduction Potential
RI/FS	Remedial Investigation/Feasibility Study
SC	Specific Conductivity
TAL	TestAmerica Laboratories, Inc.
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
Wood	Wood Environment & Infrastructure Solutions, Inc.

1.0 INTRODUCTION

On behalf of the Olin Corporation (Olin), Wood Environment & Infrastructure Solutions, Inc. (Wood E&IS) formerly Amec Foster Wheeler, presents this summary report for field activities completed in association with the Fourth Quarter 2018 groundwater, surface water, and sediment monitoring for the Slurry Wall/Cap Monitoring Program and the Plant B Monitoring Program. These activities were conducted consistent with the requirements and procedures contained in the Final Interim Response Steps Work Plan (IRSWP), Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts dated August 8, 2008 and the Volume IIIB, the Quality Assurance Project Plan, of the Final Remedial Investigation/Feasibility Study (RI/FS) Work Plan dated August 14, 2009 (MACTEC Engineering and Consulting, Inc. [MACTEC], 2009).

1.1 Limitations

This report, including its findings, opinions, and conclusions, is intended for the exclusive use and benefit of, and may be relied upon only by Olin Corporation and the United States Environmental Protection Agency (USEPA).

2.0 Slurry Wall/Cap monitoring program

The purpose of the Slurry Wall/Cap Monitoring Program is to monitor the concentrations of select constituents in groundwater, surface water, and sediment in areas adjacent to and within the South Ditch of the former Olin Facility located at 51 Eames Street, Wilmington, Massachusetts.

The Fourth Quarter 2018 groundwater, surface water, and sediment monitoring program includes collecting groundwater level measurements from select monitoring wells and piezometers, collecting and analyzing groundwater samples from 15 monitoring wells and five piezometers, collecting and analyzing surface water samples from seven locations within the East Ditch and South Ditch, and collecting and analyzing sediment samples from five locations within the East Ditch and South Ditch. Groundwater, surface water, and sediment sample locations are listed in **Table 1** and shown on **Figure 1**. The groundwater, surface water, and sediment sampling program is further described in the Final IRSWP (MACTEC, 2008), which has been approved by the USEPA.

2.1 Scope of Work

The Slurry Wall/Cap Monitoring Program for this sampling event consists of collecting groundwater level measurements in the vicinity of the South Ditch area; collecting and analyzing groundwater samples from the following monitoring wells: GW-10S, GW-24, GW-25, GW-34SR, GW-34D, GW-35S, MP-2 #15, GW-43SR, GW-76S, GW-78S, GW-79S, GW-201S, GW-202S, GW-202D, and GW-CA-1; and piezometers: PZ-16RRR, PZ-17RRR, PZ-18R, PZ-24, and PZ-25; collecting and analyzing surface water samples from the following locations: ISCO-1, ISCO-2, ISCO-3, SD-17, PZ-16RRR, PZ-17RRR, and PZ-18R; collecting and analyzing sediment samples from the following locations: SD-1, SD-2, SD-3, SD-4, and SD-5; and downloading water level and barometric pressure data from data loggers that have been installed in the following wells and piezometers: GW-10S, GW-35S, GW-CA1, GW-76S, GW-78S, GW-CA3S, GW-CA4S, PZ-24, PZ-25, and GW-6S. Monitoring wells, piezometers, surface water, and sediment sample locations are shown on **Figure 1**.

2.1.1 Groundwater Level Measurement

On November 14 through 28, 2018, Olin personnel completed a site reconnaissance of the monitoring well locations in the Slurry Wall/Cap Monitoring Program and collected groundwater level measurements. This included measuring depth to groundwater from 22 monitoring wells and piezometers using a water level meter. Groundwater level measurements and calculated groundwater elevations are summarized in **Table 2**.

2.1.2 Groundwater Sampling

On November 14 through 28, 2018, Olin personnel sampled groundwater from 15 monitoring wells and five piezometers using 2017 USEPA low stress (low flow) groundwater sampling methods.

Prior to low flow sampling, a Horiba U-52 multi-parameter water quality meter and a Hach 2100Q turbidity meter were calibrated according to the instrument manufacturer's specifications using certified calibration solutions.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing at each monitoring location. During sampling activities, the purged groundwater was continuously monitored using the multi-parameter water quality meter for pH, temperature, specific conductivity (SC), dissolved oxygen (DO), and oxidation/reduction potential (ORP), while turbidity was monitored using the Hach 2100Q turbidity meter. Well purging continued at each location until these field parameters stabilized as indicated in Appendix A of the IRSWP.

Monitoring wells GW-24, PZ-16RRR, and PZ-17RRR went dry upon purging and could not be sampled by low flow methods. These wells were purged dry and sampled upon recovery, which is the alternative approved method. Samples collected by this method typically have elevated turbidity. The final low flow purging field parameter measurements are presented in **Table 3**. Field data records for each groundwater monitoring location are attached in **Appendix A**.

Upon stabilization of groundwater parameters, groundwater samples were collected by directly filling the laboratory prepared sample bottles. A 0.45-micron pore diameter filter was used to field filter groundwater for dissolved metal analysis in accordance with the IRSWP. The samples were placed on ice and transferred to TestAmerica Laboratories, Inc. (TAL) of Buffalo, New York, under chain-of-custody for chemical analyses as summarized in **Table 4**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data are presented in the July 2019 Semi-Annual Status Report.

Purged groundwater from each monitoring well was collected in collapsible plastic containers, transported to the Block House building, adjacent to the Plant B groundwater treatment building, and containerized in a secured 55-gallon drum. Olin characterizes and disposes of that material in accordance with applicable regulations.

2.1.3 Surface Water Sampling

On December 4, 2018, Olin personnel collected six surface water samples from downstream to upstream from the East Ditch and South Ditch. The locations are identified as ISCO-2, PZ-16RRR, PZ-17RRR, SD-17, PZ-18R, and ISCO-1 as shown on **Figure 1**. No sample was collected at location ISCO-3 due to excessive mud trying to cross the South Ditch.

Before field activities began, a Horiba U-52 multi-parameter water quality meter and Hach 2100Q turbidity meter were properly calibrated to monitor surface water quality parameters at each location.

At each of the field locations, surface water parameter measurements (pH, temperature, SC, ORP, DO, and turbidity) were collected. Readings were collected by directly submersing the Horiba probe into the surface water until parameter stabilization. The final surface water field parameters are summarized in **Table 5**. Field data records from each surface water sample location are attached in **Appendix A**.

Filtered surface water samples (for dissolved metals analysis) were collected by submerging dedicated tubing attached to a peristaltic pump into the water column at a depth that minimized entraining floating or suspended sediment. The peristaltic pump provides positive pressure for field filtering the water through the 0.45-micron pore diameter filter for dissolved metal analysis.

Surface water samples were collected by directly filling the laboratory prepared glassware. The samples were then placed on ice for delivery to TAL of Buffalo, New York, under chain-of-custody for chemical analyses summarized in **Table 6**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data are presented in the July 2019 Semi-Annual Status Report.

2.1.4 Sediment Sampling

On December 4, 2018, Olin personnel collected five surface sediment samples from locations in the ditch system identified on **Table 1** and in **Figure 1**. The samples were collected from zero to six inches below grade using a stainless-steel hand auger. Sediments were mixed in a stainless-steel bowl using a stainless-steel spoon and placed in the sample containers provided by TAL. The samples were then placed on ice for delivery to TAL of Buffalo, New York, under chain-of-custody for chemical analyses summarized in **Table 7**. Field data records from the sediment sampling are attached in **Appendix A**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data will be presented in the July 2019 Semi-Annual Status Report.

2.1.5 Data Logger Data Download

Data loggers are deployed in 10 monitoring wells and piezometers: GW-10S, GW-35S, GW-CA1, GW-76S, GW-78S, GW-CA3S, GW-CA4S, PZ-24, PZ-25, and GW-6S, to continuously monitor groundwater elevation proximate to the cap area. Wood E&IS downloaded data from the 10 data loggers, along with data from the barometric pressure data logger deployed in GW-35S. Downloaded data from the loggers are presented in the July 2019 Semi-Annual Status Report.

2.1.6 Cap Inspection

The temporary cap is composed of ten large and three small scrim reinforced polyethylene sheets of 8 mil thickness. These sheets were factory fabricated with double welded seams from smaller, narrower panels. The seams between the large sheets were field fabricated by folding and sewing the edges of the sheets together with an ultraviolet (UV)-resistant thread. The original temporary cap was installed in 2001 and consisted of a 6-mil thick sheet. Due to deterioration of the 6-mil sheet, an 8-mil thick cover was installed directly over the 6-mil cover and re-ballasted with sand bags to resist wind uplift.

Since November 2016, Olin on-site personnel have been conducting the cap inspections and integrating the inspections with the maintenance repair activities. Olin has reduced the official inspection frequency from quarterly to semi-annually with informal inspections to continue to ensure that any potential significant issues are addressed in a timely fashion. The semi-annual cap inspection and maintenance field data record is included as **Appendix C** and is summarized in the July 2019 Semi-Annual Status Report (No. 24).

3.0 Plant B monitoring program

The purpose of the Plant B groundwater sampling and analysis program is to monitor groundwater quality at select monitoring wells and conduct gauging activities to determine groundwater elevations and light non-aqueous phase liquid (LNAPL) thickness.

3.1 Scope of Work

The Fourth Quarter Plant B Monitoring Program consisted of measuring groundwater levels in 28 monitoring wells within the Plant B area, gauging LNAPL thickness in monitoring wells where LNAPL was observed, and USEPA low stress (low flow) groundwater sampling at monitoring wells: B-03, GW-13, GW-16R, GW-101, IW-6, and IW-10. Groundwater monitoring wells sampled from the Plant B Monitoring Program are listed in **Table 1** and the monitoring well locations are shown on **Figure 2**.

3.1.1 Groundwater Level Measurements and LNAPL Gauging

On November 27, 2018, Olin personnel completed a site reconnaissance of the monitoring well locations in the Plant B Monitoring Program and collected groundwater level measurements and LNAPL thickness measurements. Depth to groundwater was measured in 28 monitoring wells using a water interface probe. For wells with observed LNAPL, LNAPL thickness was measured using an oil/water interface probe. Groundwater level measurements, groundwater elevations, and LNAPL thickness measurements are summarized in **Table 8**.

3.1.2 Groundwater Sampling

On November 27 and 28, 2018, Olin personnel sampled groundwater from monitoring wells: B-03, GW-13, GW-16R, GW-101, IW-6, and IW-10 following the 2017 USEPA low stress (low flow) groundwater sampling method.

Prior to low flow sampling, a Horiba U-52 multi-parameter water quality meter and Hach 2100Q turbidity meter were calibrated according to the instrument manufacturer's specifications using certified calibration solutions.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing at the sample location. During sampling activities, the purged groundwater was continuously monitored using the Horiba U-52 multi-parameter water quality meter for pH, temperature, SC, DO, and ORP, while turbidity was monitored using the Hach 2100Q turbidity meter. Well purging continued at the sample location until these field parameters stabilized as indicated in Appendix A of the IRSWP. The final low flow purging field parameter measurements are presented in **Table 9**. Field data records for each groundwater monitoring location are attached in **Appendix A**.

Upon groundwater parameter stabilization, groundwater samples were collected by directly filling the laboratory prepared glassware. The samples were placed on ice, and were transferred to TAL of Buffalo, New York, under chain-of-custody for chemical analyses as summarized in **Table 10**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data will be presented in the July 2019 Semi-Annual Status Report.

Purged groundwater from sampling activities was collected in collapsible plastic containers, transported to the Block House building, adjacent to the Plant B groundwater treatment building, and containerized in a secured 55-gallon drum. Olin characterizes and disposes of that material in accordance with applicable regulations.

4.0 References

MACTEC Engineering and Consulting, Inc. (MACTEC), August 8, 2008. Final Interim Response Steps Work Plan, Olin Chemical Superfund Site, Wilmington, Massachusetts.

MACTEC, August 14, 2009. Final RI/FS Work Plan, Olin Chemical Superfund Site, Wilmington, Massachusetts.

Tables

Table 1
Groundwater, Surface Water, and Sediment Sampling Locations
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Groundwater	Surface Water	Sediment
GW-10S	ISCO1	**SD-SD1 (MS/MSD)**
GW-24	ISCO2	SD-SD2
GW-25	ISCO3***	SD-SD3
GW-26*	PZ-16RRR	SD-SD4
GW-34SR	PZ-17RRR	**SD-SD5 (DUP)**
GW-34D	**PZ-18R**	
GW-35S	SD-17	
GW-42S**		
GW-43SR		
GW-76S		
GW-78S		
GW-79S		
GW-201S		
GW-202S		
GW-202D		
GW-CA1		
PZ-16RRR#		
PZ-17RRR #		
PZ-18R		
PZ-24		
PZ-25		
GW-16R^		
B-03^		
GW-101^		
GW-13^		
IW-10^		
IW-6^		

Notes:
Bold - DUP/ MS/ MSD collected
* - Well removed for detention basin construction
** - Well destroyed; Sampled MP-2 #13
*** - Could not sample
# - Piezometer replaced in South Ditch
^ - Plant B Monitoring Well

Prepared by: CTM 04/16/2019
Checked by: SAM 04/16/2019

Table 2
Groundwater Elevations
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL ID	Reference Elevation	Depth to Water (1, 2)	Groundwater Elevation (3)	Notes	Date Measured
I.D.	(ft msl)	(ft)	(feet NGVD)		
GW-10S	89.79	7.87	81.92	TOC	11/15/2018
GW-24	83.43	1.72	81.71		11/15/2018
GW-25	85.97	4.59	81.38		11/15/2018
GW-26*	84.93	*	---		---
GW-34D	90.36	6.51	83.85		11/15/2018
GW-34SR	89.13	5.17	83.96		11/15/2018
GW-35S	88.51	6.36	82.15		11/15/2018
GW-39^	83.64	3.79	79.85		11/28/2018
GW-42S**	84.18	**	---		---
GW-43SR	87.86	5.66	82.20		11/28/2018
GW-55D	81.95	3.43	78.52		11/28/2018
GW-55S	81.70	3.19	78.51		11/28/2018
GW-76S	88.45	6.62	81.83	TOC	11/15/2018
GW-78S	84.89	3.76	81.13		11/14/2018
GW-79S	81.54	2.57	78.97		11/14/2018
GW-201S	83.29	3.09	80.20		11/15/2018
GW-202D	86.52	5.13	81.39		11/14/2018
GW-202S	86.97	5.71	81.26		11/14/2018
GW-CA1	88.01	6.03	81.98		11/15/2018
PZ-16RRR/IN	***	3.12	---		11/14/2018
PZ-16RRR/OUT (4)	***	NM	---		---
PZ-17RRR/IN	***	2.35	---		11/14/2018
PZ-17RRR/OUT (4)	***	NM	---		---
PZ-18R/IN	82.42	2.29	80.13		11/14/2018
PZ-18R/OUT (4)	82.42	NM	---		---
PZ-24	89.43	8.00	81.43		11/14/2018
PZ-25	88.90	7.55	81.35		11/14/2018

Notes:

(1) - Measurement from top of PVC. If no PVC, measurement from TOC
(2) - Collected using a Solinst water interface probe
(3) - Groundwater Elevation = Reference Elevation - Depth to Water
(4) - Reported elevation of surface water adjacent to piezometer
TOC - Water level measurement taken from Top of Casing
* - Well removed for detention basin construction
** - Well destroyed during paving
*** - Piezometer replaced in South Ditch. Not surveyed
NGVD - National Geodetic Vertical Datum
msl - mean sea level
ft - feet
NM - not measured
^ - Well heaving

Prepared by: CTM 04/16/2019
Checked by: SAM 04/16/2019

Table 3
Final Field Parameters for Groundwater Sampling
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Slurry Wall/Cap Monitoring Wells						**Quarterly Slurry Wall/Cap Piezometer Wells**				
Location ID	GW-25	GW-78S	GW-79S	GW-202S	GW-202D	PZ-16RRR	PZ-17RRR	PZ-18R	PZ-24	PZ-25
Date	11/15/2018	11/14/2018	11/14/2018	11/14/2018	11/14/2018	11/14/2018	11/14/2018	11/14/2018	11/14/2018	11/14/2018
Depth to Water (ft)	4.89	3.95	2.80	5.73	5.14	Dry	Dry	2.54	8.18	7.57
Temperature (ºC)	10.09	9.10	11.14	11.74	11.46	8.92	7.48	7.78	13.41	14.30
Specific Conductivity (mS/cm*)	1.17	1.10	1.64	1.36	3.33	2.27	0.741	4.53	1.82	0.789
pH (standard units)	6.48	6.01	5.77	6.68	4.77	6.07	6.86	5.78	5.52	5.54
Dissolved Oxygen (mg/L)	0.79	8.51	0.08	0.10	0.10	11.28	4.82	0.10	5.67	0.98
Turbidity (NTU)	53.7	55.7	31.2	3.90	14.2	239	669	55.3	37.4	62.1
ORP (millivolts)	-111	59	34	60	230	-34	-47	-37	-36	78

Semiannual Slurry Wall/Cap Monitoring Wells										
Location ID	GW-10S	GW-24	GW-34SR	GW-34D	GW-35S	MP-2#15	GW-43SR	GW-76S	GW-201S	GW-CA-1
Date	11/15/2018	11/15/2018	11/15/2018	11/15/2018	11/15/2018	11/28/2018	11/28/2018	11/15/2018	11/15/2018	11/15/2018
Depth to Water (ft)	7.98	Dry	5.17	6.49	6.43	Multi-port	5.66	6.64	3.28	6.03
Temperature (ºC)	14.48	6.94	7.62	8.60	9.10	10.61	14.54	11.01	7.51	11.04
Specific Conductivity (mS/cm*)	0.274	0.501	0.130	0.110	1.50	0.746	0.711	0.202	3.66	0.950
pH (standard units)	4.22	6.61	6.98	5.77	7.44	5.87	5.33	5.01	6.15	7.11
Dissolved Oxygen (mg/L)	5.27	13.25	0.10	0.10	0.10	3.11	9.43	7.59	0.01	0.10
Turbidity (NTU)	0.9	75.1	2.66	63.6	12.6	70	4.20	370	65.8	1.07
ORP (millivolts)	399	-37	120	174	-152	65	167	145	125	102

Notes:
ft - feet
µS/cm - microSiemens per centimeter
* - mS/cm (milliSiemens per centimeter)
1 µS/cm = 0.001 mS/cm
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts
Dry = purged dry and sampled upon recovery

Prepared by: CTM 04/16/2019
Checked by: SAM 04/16/2019

Table 4
Groundwater Laboratory Analytical Program
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.10	mg/L
Chloride	EPA 300.0	0.28	mg/L
Specific Conductivity	SM18 2510B	1.0	µmhos/cm
Sulfate	EPA 300.0	0.35	mg/L
Filtered Metals			
Aluminum, filtered	SW846 6010B	60	µg/L
Chromium, filtered	SW846 6010B	1.0	µg/L

Notes:
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µmhos/cm = µS/cm (microSiemens per centimeter)
1 µS/cm = 0.001 mS/cm (milliSiemens per centimeter)
µg/L - micrograms per liter

Prepared by: CTM 04/16/2019
Checked by: SAM 04/16/2019

Table 5
Final Field Parameters for Surface Water Sampling
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Surface Water Locations							
Location ID	ISCO1	ISCO2	ISCO3	PZ-16RRR	PZ-17RRR	PZ-18R	SD-17
Date	12/4/2018	12/4/2018	NS	12/4/2018	12/4/2018	12/4/2018	12/4/2018
Depth of Water (in.)	10	5	NS	3	5	7	3
Temperature (ºC)	6.03	6.11	NS	5.70	6.20	5.98	6.19
Specific Conductivity (mS/cm*)	0.553	0.565	NS	0.594	0.595	0.558	0.587
pH (standard units)	6.59	5.63	NS	5.76	6.12	6.55	6.20
Dissolved Oxygen (mg/L)	5.06	13.11	NS	7.80	12.33	5.51	12.18
Turbidity (NTU)	58.8	0.1	NS	0.1	24.9	56.3	29.8
ORP (millivolts)	114	160	NS	146	110	110	131

Notes:
in. - inches
µS/cm - microSiemens per centimeter
* - mS/cm (milliSiemens per centimeter)
1 µS/cm = 0.001 mS/cm
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts
NS - Not able to collect sample

Prepared by: CTM 04/16/2019
Checked by: SAM 04/16/2019

Table 6
Surface Water Analytical Program
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.10	mg/L
Nitrate	EPA 300.0	0.02	mg/L
Nitrite	EPA 300.0	0.02	mg/L
Chloride	EPA 300.0	0.28	mg/L
Specific Conductivity	SM18 2510B	1.0	µmhos/cm
Sulfate	EPA 300.0	0.35	mg/L
Total Metals			
Aluminum, Total	SW846 6010B	60	µg/L
Chromium, Total	SW846 6010B	1.0	µg/L
Sodium, Total	SW846 6010B	320	µg/L
Filtered Metals			
Aluminum, Filtered	SW846 6010B	60	µg/L
Chromium, Filtered	SW846 6010B	1.0	µg/L
Sodium, Filtered	SW846 6010B	320	µg/L

Notes:
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µmhos/cm = µS/cm (microSiemens per centimeter)
1 µS/cm = 0.001 mS/cm (milliSiemens per centimeter)
µg/L - micrograms per liter

Prepared by: CTM 04/16/2019
Checked by: SAM 04/16/2019

Table 7
Sediment Analytical Program
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Percent Moisture	EPA 160.3	1.0	Percent
Metals			
Aluminum	SW846 6010B	6.2	mg/Kg
Chromium	SW846 6010B	0.28	mg/Kg
Iron	SW846 6010B	5.1	mg/Kg

Notes:
mg/Kg - milligrams per kilogram

Prepared by: CTM 04/16/2019
Checked by: SAM 04/16/2019

Table 8
Groundwater Elevations
Plant B Monitoring Program
Fourth Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL ID	Reference Elevation (1)	Depth to Water (2)	Depth to Product (3)	Product Thickness (4)	Groundwater Elevation (5)	Date Measured
I.D.	(ft msl)	(ft)	(ft)	(ft)	(feet NGVD)	
B-2	90.48	10.28	NPD	NA	80.20	11/27/2018
B-3	90.32	9.57	NPD	NA	80.75	11/27/2018
B-5R	91.38	9.21	NPD	NA	82.17	11/27/2018
B-7A	88.81	6.01	NPD	NA	82.80	11/27/2018
B-17	91.55	7.31	NPD	NA	84.24	11/27/2018
GW-13	90.57	10.37	NPD	NA	80.20	11/27/2018
GW-14	88.70	6.53	NPD	NA	82.17	11/27/2018
GW-15	90.01	5.83	NPD	NA	84.18	11/27/2018
GW-16R	92.46	8.61	NPD	NA	83.85	11/27/2018
GW-23	91.04	11.26	11.23	0.03	79.81	11/27/2018
GW-52S	87.95	5.83	NPD	NA	82.12	11/27/2018
GW-100	90.15	10.56	NPD	NA	79.59	11/27/2018
GW-101	90.14	10.48	NPD	NA	79.66	11/27/2018
GW-102	89.00	9.28	NPD	NA	79.72	11/27/2018
IW-1	90.71	10.03	NPD	NA	80.68	11/27/2018
IW-2	90.53	10.40	NPD	NA	80.13	11/27/2018
IW-3	90.76	10.55	10.54	0.01	80.22	11/27/2018
IW-6	89.15	9.81	NPD	NA	79.34	11/27/2018
IW-7	90.10	10.44	NPD	NA	79.66	11/27/2018
IW-8	89.94	10.18	10.17	0.01	79.77	11/27/2018
IW-9	89.78	9.87	NPD	NA	79.91	11/27/2018
IW-10	90.43	10.41	NPD	NA	80.02	11/27/2018
IW-11	89.92	10.11	10.09	0.02	79.83	11/27/2018
IW-12	90.31	10.69	NPD	NA	79.62	11/27/2018
IW-13	89.90	9.87	NPD	NA	80.03	11/27/2018
PID	89.97	10.20	NPD	NA	79.77	11/27/2018
P5	90.45	11.77	11.75	0.02	78.70	11/27/2018
12-IN	89.84	9.66	9.66	<0.01	80.18	11/27/2018

Notes:

Prepared by: CTM 04/16/2019
Checked by: SAM 04/16/2019

(1) - Reference elevations surveyed 11/97. New TOC survey by Dana Perkins 4-5/98
(2) - Top of PVC. If no PVC, measurement from top of steel casing
(3) - Collected using a Solinst water interface probe or Geotech oil/water interface probe
(4) - If sheen is noted, a product thickness of 0.01 feet will be used to calculate the groundwater elevation
(5) - Groundwater Elevation = Reference Elevation - (Depth to Water - (Product Thickness x 0.95))
TOC - Top of Casing
NPD - No Product Detected
NA - Not Applicable
NGVD - National Geodetic Vertical Datum
msl - mean sea level
ft - feet
East Ditch - No sheen noted; Observed OK

Table 9
Final Field Parameters for Groundwater Sampling
Plant B Monitoring Program
Fourth Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Plant B Monitoring Wells	
Location ID	GW-16R
Date	11/28/2018
Depth to Water (ft)	8.95
Temperature (ºC)	12.39
Specific Conductivity (mS/cm*)	0.175
pH (standard units)	7.09
Dissolved oxygen (mg/L)	5.21
Turbidity (NTU)	27.4
ORP (millivolts)	5

Annual Plant B Monitoring Wells					
Location ID	B-03	GW-13	GW-101	IW-6	IW-10
Date	11/28/2018	11/28/2018	11/27/2018	11/27/2018	11/27/2018
Depth to Water (ft)	9.58	10.77	10.50	9.93	10.57
Temperature (ºC)	12.22	11.25	12.02	14.31	10.74
Specific Conductivity (mS/cm*)	0.126	0.076	0.513	1.88	0.702
pH (standard units)	5.45	4.81	5.77	6.45	8.04
Dissolved oxygen (mg/L)	9.62	23.7 (%)	0.02	5.91	0.25
Turbidity (NTU)	2.01	3.88	2.43	215	55.6
ORP (millivolts)	313	293	-45	-81	2

Notes:
ft - feet
µS/cm - microSiemens per centimeter
* - mS/cm (milliSiemens per centimeter)
1 µS/cm = 0.001 mS/cm
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts

Prepared by: CTM 04/16/2019
Checked by: SAM 04/16/2019

Table 10
Groundwater Laboratory Analytical Program
Plant B Monitoring Program
Fourth Quarter 2018 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Volatile organic compounds (VOC)			
2,4,4-Trimethyl-1-pentene	SW846 8260B	0.40	µg/L
2,4,4-Trimethyl-2-pentene	SW846 8260B	0.43	µg/L
Semivolatile organic compounds (SVOC)			
N-nitrosodiphenylamine	SW846 8270C	0.07	µg/L
bis(2-ethylhexyl)phthalate	SW846 8270C	0.44	µg/L
Volatile Petroleum Hydrocarbons (VPH)			
C5-C8 Aliphatics	MA VPH	1.5	µg/L
C5-C8 Aliphatics, Unadjusted	MA VPH	1.5	µg/L
C9-C12 Aliphatics	MA VPH	1.5	µg/L
C9-C12 Aliphatics, Unadjusted	MA VPH	1.5	µg/L
C9-C10 Aromatics	MA VPH	0.5	µg/L
Methyl-tert-butyl-ether (MTBE)	MA VPH	0.25	µg/L
Benzene	MA VPH	0.25	µg/L
Ethylbenzene	MA VPH	0.25	µg/L
m,p-Xylene	MA VPH	0.50	µg/L
o-Xylene	MA VPH	0.25	µg/L
Toluene	MA VPH	0.25	µg/L
Naphthalene	MA VPH	0.25	µg/L
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.10	mg/L
pH	SM 4500 H+ B	0.10	SU
Filtered Metals			
Iron, Filtered	SW846 6010B	19	µg/L

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
SU - standard units

Prepared by: CTM 04/16/2019
Checked by: SAM 04/16/2019

Figures

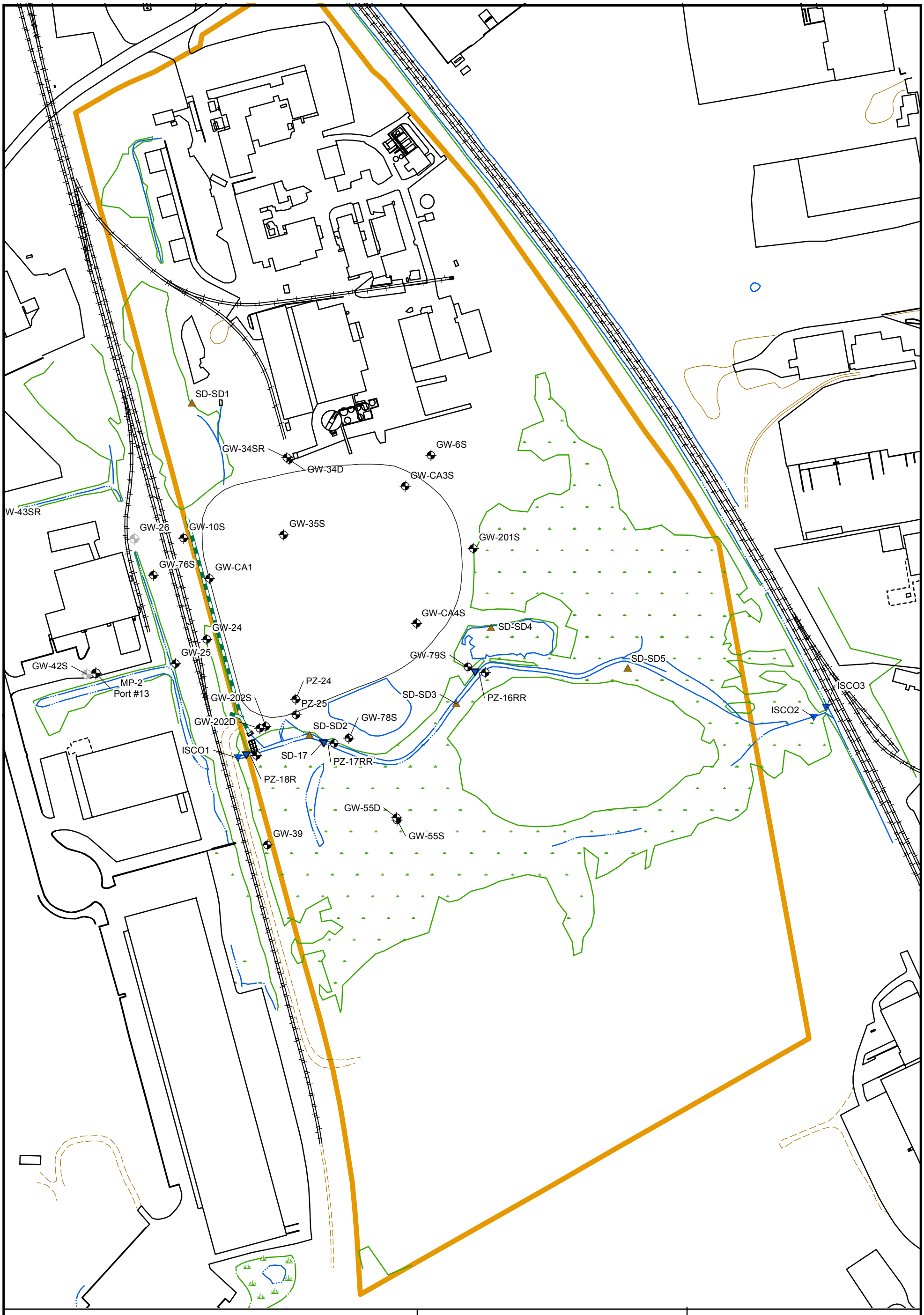
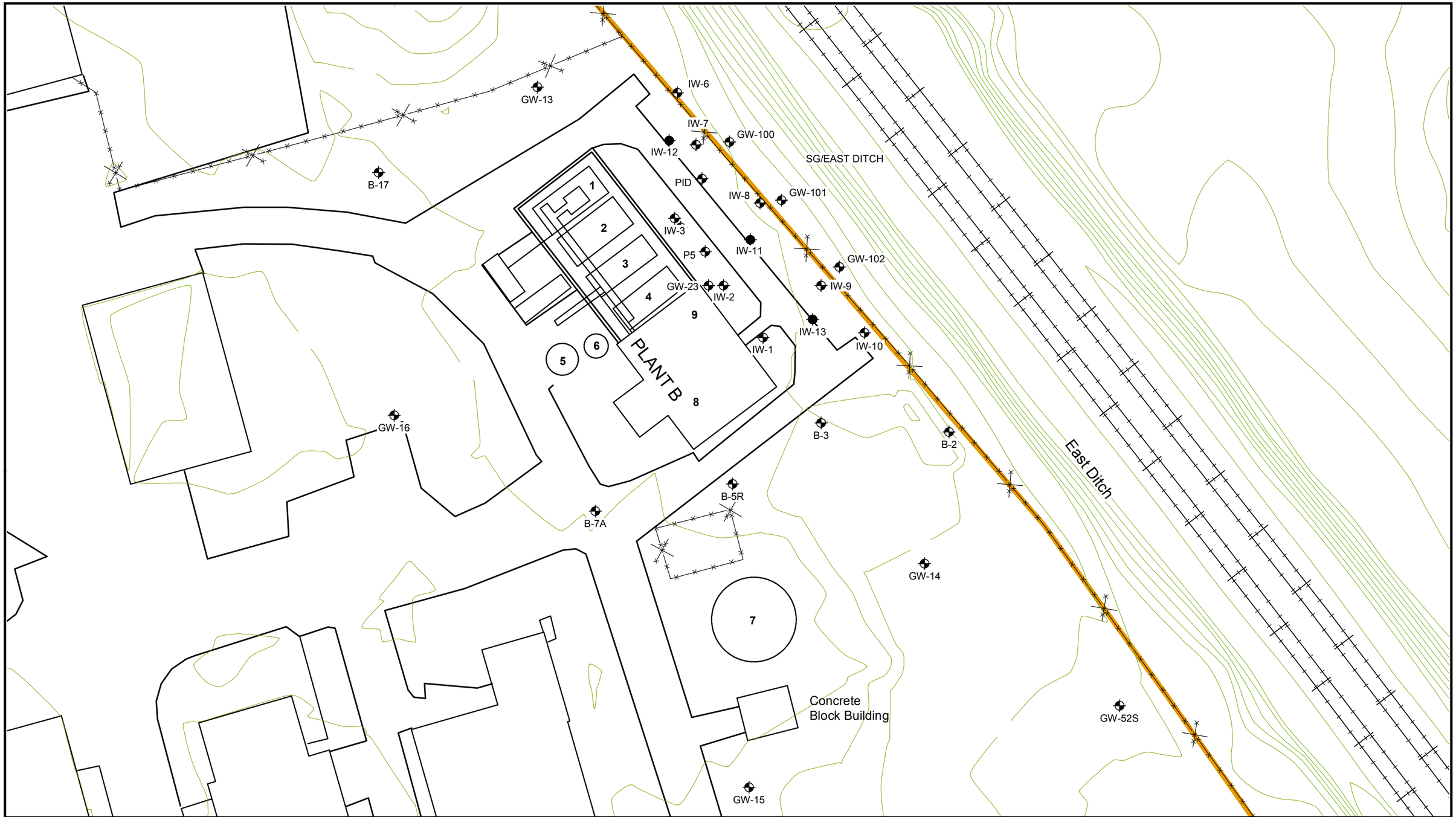


Figure 1
Slurry Wall / Cap Monitoring Program
Sample Locations

Interim Response Steps Field Activity Report
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/07/18 | Checked/Date: CTM 06/07/18

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd June 07, 2018 DWN: emily.gardiner CHKD: AKN



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Monitoring Well
- Recovery Well
- Elevation Contours

wood.
Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 2
Plant B Monitoring Program
Sampling Locations

Interim Response Steps Field Activity Report
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/07/18 | Checked/Date: CTM 06/07/18

Document: P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_11X17_LS.mxd PDF: P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\Figures\Figure 3 - Plant B Monitoring Program Sampling Locations.pdf

Appendix A

Field Data Records and Field Instrument Calibration Records

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-10S	ROUND NO.	4
SAMPLE ID	OC-GW-10S	SITE TYPE	Superfund	DATE	11/15/2018
TIME	START 7:40 END 8:30	JOB NUMBER	6107190016	BOTTLE TIME	8:20

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [ ] TOP OF WELL RISER
- [X] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 7.87 FT.

WELL DEPTH (TOR): 9.12 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 7.98 FT.

SCREEN LENGTH: N/A FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.25 GAL.

<0.01

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
7:45	7.98	120	22.82	0.231	4.57	7.09	3.0	324	~ 9 ft.	
7:50	7.98	120	21.62	0.243	4.46	6.16	3.2	341		
7:55	7.98	120	17.00	0.258	4.32	6.18	1.9	360		
8:00	7.98	120	15.91	0.263	4.24	6.01	1.3	376		
8:05	7.98	120	15.22	0.268	4.21	5.60	0.9	388		
8:10	7.98	120	14.69	0.271	4.20	5.36	0.8	394		
8:15	7.98	120	14.51	0.273	4.21	5.32	0.7	399		
8:20	7.98	120	14.48	0.274	4.22	5.27	0.9	399		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[x] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[x] Ammonia-Nitrogen
[x] Chloride	300.0	4 DEG. C	1 X 500 mL	[x] Chloride
[x] Sulfate	300.0	4 DEG. C	1 X 500 mL	[x] Sulfate
[x] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[x] Specific Conductivity
[x] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.2 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-24	ROUND NO.	4
SAMPLE ID	OC-GW-24	SITE TYPE	Superfund	DATE	11/15/2018
TIME	START 10:00 END 10:37	JOB NUMBER	6107190016	BOTTLE TIME	10:15

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 1.72 FT.

WELL DEPTH (TOR): ~ 11.9 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: Dry FT.

SCREEN LENGTH: N/A FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: N/A

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: ~0.9 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:10	---	---	6.94	0.501	6.61	13.25	75.1	-37	~ 11 ft.	
	Purge Well Dry		Sample Recharge							
10:15	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.9 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Well went dry; sample recharge

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-25	ROUND NO.	4
SAMPLE ID	OC-GW-25	SITE TYPE	Superfund	DATE	11/15/2018
TIME	START 9:15 END 9:50	JOB NUMBER	6107190016	BOTTLE TIME	9:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER	4.59 FT.	WELL DEPTH (TOR)	~ 12.35 FT.	PID AMBIENT AIR	N/A PPM	WELL DIAMETER	1.5 IN.
FINAL DEPTH TO WATER	4.89 FT.	SCREEN LENGTH	N/A FT.	PID WELL MOUTH	N/A PPM		
DRAWDOWN VOLUME (final - initial x 0.16 {2-inch} or x 0.65 {4-inch})	0.03 GAL.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED		PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	0.81 GAL.	0.03		REFILL TIMER SETTING	N/A SEC.	DISCHARGE TIMER SETTING	N/A SEC.

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:20	4.85	125	8.73	1.01	6.32	3.28	77.5	118	~ 11 ft.	
9:25	4.89	125	9.37	1.18	6.27	0.85	70.2	-25		
9:30	4.89	125	10.00	1.19	6.46	0.73	60.9	-99		
9:35	4.89	125	10.07	1.17	6.48	0.78	57.1	-107		
9:40	4.89	125	10.09	1.17	6.48	0.79	53.7	-111		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 125 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 125 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 125 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 250 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 0.8 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-34SR	ROUND NO.	4
SAMPLE ID	OC-GW-34SR	SITE TYPE	Superfund	DATE	11/15/2018
TIME	START 10:05 END 11:05	JOB NUMBER	6107190016	BOTTLE TIME	10:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 5.17 FT.

WELL DEPTH (TOR): ~ 17.04 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 5.17 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.34 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:10	5.17	180	6.51	0.160	8.59	0.10	24.1	-42	~ 15 ft.	
10:15	5.17	180	6.68	0.150	8.38	0.10	8.58	29		
10:20	5.17	180	6.90	0.150	7.86	0.10	7.72	61		
10:25	5.17	180	6.99	0.140	7.63	0.10	4.97	75		
10:30	5.17	180	7.11	0.140	7.46	0.10	5.34	85		
10:35	5.17	180	7.28	0.140	7.27	0.10	5.17	95		
10:40	5.17	180	7.40	0.130	7.13	0.10	4.42	110		
10:45	5.17	180	7.49	0.130	6.98	0.10	2.70	111		
10:50	5.17	180	7.56	0.130	6.96	0.10	2.81	116		
10:55	5.17	180	7.62	0.130	6.98	0.10	2.66	120		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 500 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 2.3 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: LJ

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-34D	ROUND NO.	4
SAMPLE ID	OC-GW-34D	SITE TYPE	Superfund	DATE	11/15/2018
TIME	START 11:10 END 11:55	JOB NUMBER	6107190016	BOTTLE TIME	11:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.51 FT.

WELL DEPTH (TOR): ~ 35.75 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.49 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED		X	
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.25 GAL.

<0.01

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:10	6.49	150	7.42	0.190	7.68	0.10	3.70	33	~ 32 ft.	
11:15	6.49	160	6.88	0.180	6.61	0.10	69.3	117		
11:20	6.49	160	7.29	0.130	6.08	0.10	68.4	143		
11:25	6.49	160	8.10	0.120	5.88	0.10	67.1	163		
11:30	6.49	160	8.35	0.110	5.77	0.10	65.5	171		
11:35	6.49	160	8.52	0.110	5.76	0.10	63.9	172		
11:40	6.49	160	8.60	0.110	5.77	0.10	63.6	174		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[x] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[x] Ammonia-Nitrogen
[x] Chloride	300.0	4 DEG. C	1 X 500 mL	[x] Chloride
[x] Sulfate	300.0	4 DEG. C	1 X 500 mL	[x] Sulfate
[x] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[x] Specific Conductivity
[x] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.3 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: LJ

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-35S	ROUND NO.	4
SAMPLE ID	OC-GW-35S	SITE TYPE	Superfund	DATE	11/15/2018
TIME	START 9:10 END 10:00	JOB NUMBER	6107190016	BOTTLE TIME	9:50

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.36 FT.

WELL DEPTH (TOR): ~ 19.51 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.43 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.66 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:15	6.43	160	8.03	1.44	7.98	0.10	60.4	-109	~ 17 ft.	
9:20	6.43	160	8.76	1.45	7.95	0.10	32.9	-119		
9:25	6.43	160	9.00	1.46	7.78	0.10	19.6	-120		
9:30	6.43	160	9.08	1.48	7.59	0.10	14.6	-110		
9:35	6.43	160	9.11	1.48	7.59	0.10	12.8	-136		
9:40	6.43	160	9.11	1.47	7.50	0.10	12.5	-146		
9:45	6.43	160	9.09	1.49	7.45	0.10	13.3	-150		
9:50	6.43	160	9.10	1.50	7.44	0.10	12.6	-152		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.7 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: LJ

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-43SR	ROUND NO.	4
SAMPLE ID	OC-GW-43SR	SITE TYPE	Superfund	DATE	11/28/2018
TIME	START 8:10 END 9:05	JOB NUMBER	6107190016	BOTTLE TIME	8:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: DUP/MS/MSD

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 5.66 FT.

WELL DEPTH (TOR): ~ 17.4 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 5.66 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.72 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:15	5.66	220	17.22	0.757	5.41	15.36	62.5	211	~ 16 ft.	
8:20	5.66	220	15.24	0.759	5.39	11.53	52.2	187		
8:25	5.66	220	15.01	0.719	5.34	10.20	32.1	173		
8:30	5.66	220	14.62	0.710	5.33	9.52	4.91	165		
8:35	5.66	220	14.58	0.711	5.33	9.47	4.21	166		
8:40	5.66	220	14.54	0.711	5.33	9.43	4.20	167		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[x] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[x] Ammonia-Nitrogen
[x] Chloride	300.0	4 DEG. C	1 X 500 mL	[x] Chloride
[x] Sulfate	300.0	4 DEG. C	1 X 500 mL	[x] Sulfate
[x] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[x] Specific Conductivity
[x] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 1.7 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

DUP/MS/MSD Collected

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-76S	ROUND NO.	4
SAMPLE ID	OC-GW-76S	SITE TYPE	Superfund	DATE	11/15/2018
TIME	START 8:30 END 9:05	JOB NUMBER	6107190016	BOTTLE TIME	8:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.62 FT.

WELL DEPTH (TOR): ~ 15.1 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.64 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.04 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:35	6.64	160	11.60	0.400	5.73	13.58	344	137	~ 12 ft.	
8:40	6.64	160	11.38	0.215	5.38	9.30	573	112		
8:45	6.64	160	11.30	0.205	5.12	8.25	401	133		
8:50	6.64	160	11.20	0.203	5.05	7.92	381	141		
8:55	6.64	160	11.01	0.202	5.01	7.59	370	145		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[x] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[x] Ammonia-Nitrogen
[x] Chloride	300.0	4 DEG. C	1 X 500 mL	[x] Chloride
[x] Sulfate	300.0	4 DEG. C	1 X 500 mL	[x] Sulfate
[x] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[x] Specific Conductivity
[x] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 1.0 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-78S	ROUND NO.	4
SAMPLE ID	OC-GW-78S	SITE TYPE	Superfund	DATE	11/14/2018
TIME	START 9:25 END 10:00	JOB NUMBER	6107190016	BOTTLE TIME	9:50

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.76 FT.

WELL DEPTH (TOR): ~ 10.35 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.95 FT.

SCREEN LENGTH: 9 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.03 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.11 GAL.

0.02

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:30	3.93	170	8.89	1.08	6.27	15.04	180	-34	~ 9 ft.	
9:35	3.95	170	8.75	1.10	6.07	9.67	150	15		
9:40	3.95	170	9.07	1.10	6.02	8.59	63.1	55		
9:45	3.95	170	9.17	1.10	6.02	8.59	59.2	56		
9:50	3.95	170	9.10	1.10	6.01	8.51	55.7	59		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 1.1 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-79S	ROUND NO.	4
SAMPLE ID	OC-GW-79S	SITE TYPE	Superfund	DATE	11/14/2018
TIME	START 10:35 END 11:10	JOB NUMBER	6107190016	BOTTLE TIME	11:00

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.57 FT.

WELL DEPTH (TOR): ~ 11.25 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 2.80 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.03 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: <0.01

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.17 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:40	2.79	180	10.42	1.62	6.08	0.33	87.2	40	~ 9 ft.	
10:45	2.80	180	11.28	1.64	5.82	0.01	29.3	38		
10:50	2.80	180	11.35	1.64	5.78	0.04	29.7	35		
10:55	2.80	180	11.13	1.64	5.78	0.09	30.4	34		
11:00	2.80	180	11.14	1.64	5.77	0.08	31.2	34		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [X] HIGH DENSITY POLYETHYLENE
- [ ] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.2 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-201S	ROUND NO.	4
SAMPLE ID	OC-GW-201S	SITE TYPE	Superfund	DATE	11/15/2018
TIME	START 10:35 END 11:05	JOB NUMBER	6107190016	BOTTLE TIME	10:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.09 FT.

WELL DEPTH (TOR): ~ 14.95 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.28 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.03 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.83 GAL.

0.03

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:40	3.28	160	6.37	3.76	6.71	3.00	74.6	83	~ 12 ft.	
10:40	3.28	160	7.20	3.70	6.23	0.17	74.0	116		
10:45	3.28	160	7.39	3.68	6.19	0.03	73.7	120		
10:50	3.28	160	7.47	3.67	6.15	0.01	69.3	124		
10:55	3.28	160	7.51	3.66	6.15	0.01	65.8	125		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[x] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[x] Ammonia-Nitrogen
[x] Chloride	300.0	4 DEG. C	1 X 500 mL	[x] Chloride
[x] Sulfate	300.0	4 DEG. C	1 X 500 mL	[x] Sulfate
[x] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[x] Specific Conductivity
[x] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 1.0 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-202S	ROUND NO.	4
SAMPLE ID	OC-GW-202S	SITE TYPE	Superfund	DATE	11/14/2018
TIME	START 9:15 END 10:05	JOB NUMBER	6107190016	BOTTLE TIME	9:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 5.71 FT.

WELL DEPTH (TOR): ~ 13.3 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 5.73 FT.

SCREEN LENGTH: 8 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: <0.01

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.87 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:20	5.74	180	11.59	1.36	7.11	0.10	23.9	-3	~ 11 ft.	
9:25	5.73	180	11.65	1.34	7.09	0.10	14.4	18		
9:30	5.73	180	11.67	1.34	6.95	0.10	4.75	36		
9:35	5.73	180	11.71	1.35	6.88	0.10	4.48	42		
9:40	5.73	180	11.75	1.35	6.71	0.10	5.07	54		
9:45	5.73	180	11.74	1.35	6.70	0.10	4.78	57		
9:50	5.73	180	11.74	1.35	6.67	0.10	3.86	60		
9:55	5.73	180	11.74	1.36	6.68	0.10	3.90	60		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.9 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: LJ

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-202D	ROUND NO.	4
SAMPLE ID	OC-GW-202D	SITE TYPE	Superfund	DATE	11/14/2018
TIME	START 8:05 END 9:10	JOB NUMBER	6107190016	BOTTLE TIME	8:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: DUP/MS/MSD

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER	5.13 FT.	WELL DEPTH (TOR)	~ 23.7 FT.	PID AMBIENT AIR	N/A PPM
FINAL DEPTH TO WATER	5.14 FT.	SCREEN LENGTH	10 FT.	PID WELL MOUTH	N/A PPM
DRAWDOWN VOLUME (final - initial x 0.16 {2-inch} or x 0.65 {4-inch})	<0.01 GAL.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED		PRESSURE TO PUMP	N/A PSI
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	1.46 GAL.	<0.01		REFILL TIMER SETTING	N/A SEC.

WELL DIAMETER: 2 IN.

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:15	5.14	140	14.01	3.37	4.75	0.10	39.8	208	~ 20 ft.	
8:20	5.14	140	11.88	3.52	4.62	0.10	32.6	236		
8:25	5.14	140	11.77	3.50	4.65	0.10	27.8	235		
8:30	5.14	140	12.13	3.40	4.66	0.10	21.6	231		
8:35	5.14	140	11.81	3.37	4.74	0.10	15.8	231		
8:40	5.14	140	11.51	3.34	4.78	0.10	14.9	230		
8:45	5.14	140	11.46	3.33	4.77	0.10	14.2	230		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.5 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Collected DUP/MS/MSD

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: LJ

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-CA1	ROUND NO.	4
SAMPLE ID	OC-GW-CA1	SITE TYPE	Superfund	DATE	11/15/2018
TIME	START 8:00 END 9:05	JOB NUMBER	6107190016	BOTTLE TIME	8:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER	6.03 FT.	WELL DEPTH (TOR)	~ 9.27 FT.	PID AMBIENT AIR	N/A PPM	WELL DIAMETER	2 IN.
FINAL DEPTH TO WATER	6.03 FT.	SCREEN LENGTH	5 FT.	PID WELL MOUTH	N/A PPM		
DRAWDOWN VOLUME (final - initial x 0.16 {2-inch} or x 0.65 {4-inch})	<0.01 GAL.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED		PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	2.29 GAL.	<0.01		REFILL TIMER SETTING	N/A SEC.	DISCHARGE TIMER SETTING	N/A SEC.

WELL INTEGRITY:	YES	NO	N/A
CAP		X	
CASING	X		
LOCKED	X		
COLLAR	X		

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:05	6.03	160	18.64	0.860	6.84	0.10	52.1	92	~ 8 ft.	
8:10	6.03	160	14.89	0.900	6.90	0.10	38.9	38		
8:15	6.03	160	13.97	0.900	6.92	0.10	16.1	48		
8:20	6.03	160	13.41	0.900	6.95	0.10	6.86	55		
8:25	6.03	160	13.11	0.900	6.97	0.10	4.49	62		
8:30	6.03	160	12.30	0.920	6.98	0.10	2.12	81		
8:35	6.03	160	12.05	0.930	7.01	0.10	1.24	89		
8:40	6.03	160	11.63	0.940	7.05	0.10	1.13	96		
8:45	6.03	160	11.17	0.940	7.07	0.10	1.14	101		
8:50	6.03	160	11.09	0.940	7.09	0.10	1.12	102		
8:55	6.03	160	11.04	0.950	7.11	0.10	1.07	102		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[x] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[x] Ammonia-Nitrogen
[x] Chloride	300.0	4 DEG. C	1 X 500 mL	[x] Chloride
[x] Sulfate	300.0	4 DEG. C	1 X 500 mL	[x] Sulfate
[x] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[x] Specific Conductivity
[x] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 2.3 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: LJ

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	MP-2#15	ROUND NO.	4
SAMPLE ID	OC-MP2#15	SITE TYPE	Superfund	DATE	11/28/2018
TIME	START 9:20 END 9:55	JOB NUMBER	6107190016	BOTTLE TIME	9:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [ ] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: N/A FT.

WELL DEPTH (TOR): ~ 10.5 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: multi-port IN.

FINAL DEPTH TO WATER: N/A FT.

SCREEN LENGTH: multi-port FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: N/A

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.98 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:25	-	150	12.16	1.00	6.64	10.82	751	93	~ 10.5 ft.	Multi-port well
9:30	-	150	10.17	0.901	6.10	10.10	512	64		
9:35	-	150	10.46	0.750	5.89	3.01	78	66		
9:40	-	150	10.58	0.747	5.87	3.09	73	66		
9:45	-	150	10.61	0.746	5.87	3.11	70	65		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [X] HIGH DENSITY POLYETHYLENE
- [ ] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.0 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

MP-2 #15 replaces GW-42S

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-16RRR	ROUND NO.	4
SAMPLE ID	OC-PZ-16RRR	SITE TYPE	Superfund	DATE	11/14/2018
TIME	START 11:15 END 11:50	JOB NUMBER	6107190016	BOTTLE TIME	11:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [ ] TOP OF WELL RISER
- [X] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.12 FT.

WELL DEPTH (TOR): ~ 6 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.0 IN.

FINAL DEPTH TO WATER: Dry FT.

SCREEN LENGTH: 2 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP		X	
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: N/A

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: ~0.1 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:20	---	---	8.92	2.27	6.07	11.28	239	-34	~ 6 ft.	
	Well Dry	Sample Recharge								
11:30	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.1 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Well went dry; sample recharge

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-17RRR	ROUND NO.	4
SAMPLE ID	OC-PZ17RRR	SITE TYPE	Superfund	DATE	11/14/2018
TIME	START 10:05 END 10:35	JOB NUMBER	6107190016	BOTTLE TIME	10:25

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [ ] TOP OF WELL RISER; [X] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.35 FT.

WELL DEPTH (TOR): ~ 6.65 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.0 IN.

FINAL DEPTH TO WATER: Dry FT.

SCREEN LENGTH: 1 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP		X	
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.1 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

N/A

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:10	---	---	7.48	0.741	6.86	4.82	669	-47	~ 6.5 ft.	
	Well Dry	Sample Recharge								
10:25	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.1 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Well went dry; sample recharge

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-18R	ROUND NO.	4
SAMPLE ID	OC-PZ-18R	SITE TYPE	Superfund	DATE	11/14/2018
TIME	START 10:15 END 11:00	JOB NUMBER	6107190016	BOTTLE TIME	10:50

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [ ] TOP OF WELL RISER [X] TOP OF PROTECTIVE CASING [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.29 FT.

WELL DEPTH (TOR): ~ 5.99 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.25 IN.

FINAL DEPTH TO WATER: 2.54 FT.

SCREEN LENGTH: 1.6 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: 0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.10 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:20	2.54	120	7.38	5.18	4.65	0.10	864	-21	~ 5.5 ft.	
10:25	2.54	120	7.59	4.63	4.82	0.10	352	-20		
10:30	2.54	120	7.70	4.51	5.46	0.10	166	-38		
10:35	2.54	120	7.74	4.51	5.47	0.10	85.9	-31		
10:40	2.54	120	7.58	4.53	5.70	0.10	59.7	-37		
10:45	2.54	120	7.63	4.52	5.68	0.10	60.4	-34		
10:50	2.54	120	7.78	4.53	5.78	0.10	55.3	-37		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.1 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: LJ

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-24	ROUND NO.	4
SAMPLE ID	OC-PZ-24	SITE TYPE	Superfund	DATE	11/14/2018
TIME	START 8:50 END 9:20	JOB NUMBER	6107190016	BOTTLE TIME	9:15

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 8.00 FT.

WELL DEPTH (TOR): ~ 17.65 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 8.18 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.98 GAL.

0.01

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:55	8.18	150	12.36	1.73	5.73	7.83	58.1	-16	~ 16 ft.	
9:00	8.18	150	13.03	1.75	5.58	6.35	54.0	-27		
9:05	8.18	150	13.23	1.80	5.53	5.80	38.1	-31		
9:10	8.18	150	13.40	1.82	5.52	5.70	38.2	-35		
9:15	8.18	150	13.41	1.82	5.52	5.67	37.4	-36		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.0 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-25	ROUND NO.	4
SAMPLE ID	OC-PZ-25	SITE TYPE	Superfund	DATE	11/14/2018
TIME	START 7:55 END 8:45	JOB NUMBER	6107190016	BOTTLE TIME	8:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 7.55 FT.

WELL DEPTH (TOR): ~ 17.75 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 7.57 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.37 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:00	7.57	150	16.11	0.461	5.52	2.86	35.6	158	~ 15 ft.	
8:05	7.57	150	14.77	0.659	5.57	0.91	63.5	123		
8:10	7.57	150	14.61	0.710	5.57	0.98	63.0	104		
8:15	7.57	150	14.50	0.748	5.55	1.02	62.9	91		
8:20	7.57	150	14.34	0.784	5.54	1.02	62.4	84		
8:25	7.57	150	14.35	0.787	5.54	0.99	62.1	80		
8:30	7.57	150	14.30	0.789	5.54	0.98	62.1	78		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.4 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	B-03	ROUND NO.	4
SAMPLE ID	OC-B-03	SITE TYPE	Superfund	DATE	11/28/2018
TIME	START 8:15 END 9:35	JOB NUMBER	6107190016	BOTTLE TIME	9:15

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): See survey FT.

PROTECTIVE CASING / WELL DIFFERENCE: -- FT.

INITIAL DEPTH TO WATER: 9.56 FT.

WELL DEPTH (TOR): ~ 15.42 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 9.58 FT.

SCREEN LENGTH: - FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.57 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:30	9.58	180	14.40	0.153	6.43	11.17	15.8	203	~ 14 ft.	
8:35	9.58	180	13.54	0.132	6.30	8.31	6.24	236		
8:40	9.58	180	13.01	0.129	5.95	8.72	4.62	270		
8:45	9.58	180	12.78	0.127	5.78	10.33	2.75	285		
8:50	9.58	180	12.55	0.123	5.53	9.58	2.81	298		
8:55	9.58	180	12.40	0.127	5.53	9.33	2.43	303		
9:00	9.58	180	12.35	0.125	5.50	9.97	1.94	308		
9:05	9.58	180	12.28	0.126	5.47	9.79	1.98	310		
9:10	9.58	180	12.22	0.126	5.45	9.62	2.01	313		
9:15	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 2.6 gal.

NOTES

LOCATION SKETCH

Sampled by: LJ

Prepared by: SAM

Checked by: CTM

SIGNATURE: Field Form w/ Signature on File

AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-13	ROUND NO.	4
SAMPLE ID	OC-GW-13	SITE TYPE	Superfund	DATE	11/28/2018
TIME	START 9:40 END 11:05	JOB NUMBER	6107190016	BOTTLE TIME	10:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): See survey FT.

PROTECTIVE CASING / WELL DIFFERENCE: -- FT.

INITIAL DEPTH TO WATER: 10.47 FT.

WELL DEPTH (TOR): ~ 19.75 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 3 IN.

FINAL DEPTH TO WATER: 10.77 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.11 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.72 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

0.04

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (%) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:40	10.77	200	11.78	0.071	6.88	> 50	7.88	225	~ 18 ft.	
9:45	10.77	200	11.77	0.070	6.56	> 50	7.80	241		
9:50	10.77	200	11.72	0.070	6.30	> 50	7.46	255		
9:55	10.77	190	11.58	0.071	6.05	48.19	8.15	267		
10:00	10.77	190	11.48	0.071	5.80	48.38	7.76	272		
10:05	10.77	190	11.54	0.072	5.44	48.70	6.69	280		
10:10	10.77	190	11.46	0.072	5.18	30.24	5.03	282		
10:15	10.77	190	11.49	0.073	5.08	28.71	4.54	289		
10:20	10.77	190	11.57	0.074	4.95	24.93	4.41	292		
10:25	10.77	190	11.55	0.074	4.89	24.72	3.86	288		
10:30	10.77	190	11.41	0.075	4.87	23.71	3.93	284		
10:35	10.77	190	11.25	0.076	4.81	23.70	3.88	293		
10:40	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~2.7 gal.

NOTES

LOCATION SKETCH

Sampled by: LJ

Prepared by: SAM

Checked by: CTM

SIGNATURE: Field Form w/ Signature on File

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-16R	ROUND NO.	4
SAMPLE ID	OC-GW-16R	SITE TYPE	Superfund	DATE	11/28/2018
TIME	START 10:05 END 12:30	JOB NUMBER	6107190016	BOTTLE TIME	10:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: DUP/ MS/ MSD

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER	8.41 FT.	WELL DEPTH (TOR)	~ 17.2 FT.	PID AMBIENT AIR	N/A PPM	WELL DIAMETER	2 IN.
FINAL DEPTH TO WATER	8.95 FT.	SCREEN LENGTH	5 FT.	PID WELL MOUTH	N/A PPM		
DRAWDOWN VOLUME (final - initial x 0.16 {2-inch} or x 0.65 {4-inch})	0.08 GAL.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED		PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	1.37 GAL.	0.06		REFILL TIMER SETTING	N/A SEC.	DISCHARGE TIMER SETTING	N/A SEC.

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:10	8.94	150	11.33	0.220	8.28	9.47	326	-26	~ 16 ft.	
10:15	8.94	150	11.98	0.199	7.84	6.47	110	-16		
10:20	8.94	150	12.06	0.194	7.41	5.94	51.3	-4		
10:25	8.94	150	12.22	0.180	7.17	5.63	50.0	4		
10:30	8.95	150	12.38	0.175	7.08	5.27	21.3	5		
10:35	8.95	150	12.40	0.175	7.09	5.22	22.7	5		
10:40	8.95	150	12.39	0.175	7.09	5.21	27.4	5		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 1.4 gal.

NOTES DUP/ MS/ MSD Collected

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-101	ROUND NO.	4
SAMPLE ID	OC-GW-101	SITE TYPE	Superfund	DATE	11/27/2018
TIME	START 9:25 END 11:30	JOB NUMBER	6107190016	BOTTLE TIME	10:05

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): See survey FT.

PROTECTIVE CASING / WELL DIFFERENCE: -- FT.

INITIAL DEPTH TO WATER: 10.50 FT.

WELL DEPTH (TOR): ~ 18.75 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 10.50 FT.

SCREEN LENGTH: 11.5 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.82 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:35	10.50	175	17.54	0.304	3.71	12.54	496	180	~ 17 ft.	
9:40	10.50	175	15.79	0.837	6.02	6.49	426	-69		
9:45	10.50	175	11.93	0.591	5.78	0.01	10.7	-1		
9:50	10.50	175	12.16	0.562	5.91	0.01	4.32	-31		
9:55	10.50	175	12.12	0.535	5.87	0.01	3.97	-42		
10:00	10.50	175	12.01	0.509	5.78	0.02	2.61	-48		
10:05	10.50	175	12.02	0.513	5.77	0.02	2.43	-45		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.8 gal.

LOCATION SKETCH

NOTES

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

SIGNATURE: Field Form w/ Signature on File

AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	IW-6	ROUND NO.	4
SAMPLE ID	OC-IW-6	SITE TYPE	Superfund	DATE	11/27/2018
TIME	START 9:30 END 11:35	JOB NUMBER	6107190016	BOTTLE TIME	10:00

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): See survey FT.

PROTECTIVE CASING / WELL DIFFERENCE: -- FT.

INITIAL DEPTH TO WATER: 9.87 FT.

WELL DEPTH (TOR): ~ 18.9 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 6 IN.

FINAL DEPTH TO WATER: 9.93 FT.

SCREEN LENGTH: - FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.09 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.17 GAL.

0.07

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:35	9.93	150	16.52	1.80	5.85	6.68	553	-56	~ 17 ft.	
9:40	9.93	150	15.79	1.83	6.02	6.49	426	-69		
9:45	9.93	150	15.20	1.85	6.22	6.14	254	-74		
9:50	9.93	150	14.83	1.86	6.42	5.96	223	-78		
9:55	9.93	150	14.43	1.88	6.47	5.92	213	-80		
10:00	9.93	150	14.31	1.88	6.45	5.91	215	-81		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 1.2 gal.

NOTES

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

SIGNATURE: Field Form w/ Signature on File

AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	IW-10	ROUND NO.	4
SAMPLE ID	OC-IW-10	SITE TYPE	Superfund	DATE	11/27/2018
TIME	START 11:50 END 13:30	JOB NUMBER	6107190016	BOTTLE TIME	12:15

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): See survey FT.

PROTECTIVE CASING / WELL DIFFERENCE: -- FT.

INITIAL DEPTH TO WATER: 10.55 FT.

WELL DEPTH (TOR): ~ 21.17 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 6 IN.

FINAL DEPTH TO WATER: 10.57 FT.

SCREEN LENGTH: -- FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.03 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.98 GAL.

0.03

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (mS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:55	10.57	150	9.17	0.732	8.15	1.79	415	16	~ 20 ft.	
12:00	10.57	150	10.40	0.706	8.17	0.49	163	2		
12:05	10.57	150	10.64	0.703	8.09	0.30	57.3	1		
12:10	10.57	150	10.68	0.702	8.05	0.27	59.1	1		
12:15	10.57	150	10.74	0.702	8.04	0.25	55.6	2		
	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.0 gal.

NOTES

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: BEG

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SW-ISCO2 | ACTIVITY TIME: START 8:40 END 9:00 | BOTTLE TIME: 8:50

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	10 in.	SPEC. COND	0.565 mS/cm
DEPTH OF SAMPLE FROM SURFACE	5 in.	D.O.	13.11 mg/L
TEMPERATURE	6.11 DEG C	SALINITY	--- %
TURBIDITY	0.1 NTU	ORP	160 mV
pH	5.63 UNITS		

EQUIPMENT USED: [ ] BEAKER; [ ] PACS BOMB; [X] PERISTALTIC PUMP; [X] FILTER (0.45 micron); [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER: [X] STREAM/ DITCH; [ ] LAKE/ POND; [ ] SEEP; [ ] MARSH; [X] OTHER South Ditch

DECON FLUIDS USED: [ ] DI WATER; [ ] POTABLE WATER; [ ] NONE

Notes: Location prior to discharge into the East Ditch

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS: ODOR _____ COLOR _____

TYPE OF SEDIMENT: [ ] ORGANIC; [ ] SAND; [ ] GRAVEL; [ ] CLAY; [ ] OTHER_____

EQUIPMENT FOR COLLECTION: [ ] HAND AUGER; [ ] S.S. SPOON; [ ] ALUMINIUM PAN; [ ] DREDGE; [ ] OTHER _____

DECON FLUIDS USED: [ ] DI WATER; [ ] POTABLE WATER; [ ] LIQUINOX; [ ] OTHER _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAM
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SW-ISCO3 (Not Sampled) | ACTIVITY TIME: START 8:20 END 8:35 | BOTTLE TIME: N/A

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	N/A ft.	SPEC. COND	N/A mS/cm
DEPTH OF SAMPLE FROM SURFACE	N/A ft.	D.O.	N/A mg/L
TEMPERATURE	N/A DEG C	SALINITY	--- %
TURBIDITY	N/A NTU	ORP	N/A mV
pH	N/A UNITS		

EQUIPMENT USED:
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER:
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER East Ditch

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: East Ditch; Up-stream of South Ditch confluence; Along Railway

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ] | SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION:
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	[ ]
[ ]	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES Not able to collect sample. Could not cross the South Ditch to access the East Ditch. Mud ~ 16 in. deep.

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAM
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SW-PZ16RRR | ACTIVITY TIME: START 9:10 END 9:25 | BOTTLE TIME: 9:15

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	7 in.	SPEC. COND	0.594 mS/cm
DEPTH OF SAMPLE FROM SURFACE	3 in.	D.O.	7.80 mg/L
TEMPERATURE	5.70 DEG C	SALINITY	--- %
TURBIDITY	0.1 NTU	ORP	146 mV
pH	5.76 UNITS		

EQUIPMENT USED: [ ] BEAKER; [ ] PACS BOMB; [X] PERISTALTIC PUMP; [X] FILTER (0.45 micron); [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER: [X] STREAM/ DITCH; [ ] LAKE/ POND; [ ] SEEP; [ ] MARSH; [X] OTHER South Ditch

DECON FLUIDS USED: [ ] DI WATER; [ ] POTABLE WATER; [ ] NONE

Notes: At location PZ-16RRR

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS: ODOR _____ COLOR _____

TYPE OF SEDIMENT: [ ] ORGANIC; [ ] SAND; [ ] GRAVEL; [ ] CLAY; [ ] OTHER_____

EQUIPMENT FOR COLLECTION: [ ] HAND AUGER; [ ] S.S. SPOON; [ ] ALUMINIUM PAN; [ ] DREDGE; [ ] OTHER _____

DECON FLUIDS USED: [ ] DI WATER; [ ] POTABLE WATER; [ ] LIQUINOX; [ ] OTHER _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAM
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SW-PZ17RRR | ACTIVITY TIME: START 9:30 END 9:50 | BOTTLE TIME: 9:40

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	12 in.	SPEC. COND	0.595 mS/cm
DEPTH OF SAMPLE FROM SURFACE	5 in.	D.O.	12.33 mg/L
TEMPERATURE	6.20 DEG C	SALINITY	--- %
TURBIDITY	24.9 NTU	ORP	110 mV
pH	6.12 UNITS		

EQUIPMENT USED

- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER

- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER South Ditch

DECON FLUIDS USED:

- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: At location PZ-17RRR

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT

- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION

- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED

- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAM
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SW-PZ18R | ACTIVITY TIME: START 10:15 END 11:05 | BOTTLE TIME: 10:25

QC SAMPLES COLLECTED: DUP/ MS/ MSD

SURFACE WATER DATA

WATER DEPTH AT LOCATION	15 in.	SPEC. COND	0.558 mS/cm
DEPTH OF SAMPLE FROM SURFACE	7 in.	D.O.	5.51 mg/L
TEMPERATURE	5.98 DEG C	SALINITY	--- %
TURBIDITY	56.3 NTU	ORP	110 mV
pH	6.55 UNITS		

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER: Weir Area

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: At location PZ-18R

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ]

TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES DUP/ MS/ MSD Collected

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAM
Checked by: CTM

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FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SW-SD17 | ACTIVITY TIME: START 9:55 END 10:10 | BOTTLE TIME: 10:00

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	7 in.	SPEC. COND	0.587 mS/cm
DEPTH OF SAMPLE FROM SURFACE	3 in.	D.O.	12.18 mg/L
TEMPERATURE	6.19 DEG C	SALINITY	--- %
TURBIDITY	29.8 NTU	ORP	131 mV
pH	6.20 UNITS		

EQUIPMENT USED: [ ] BEAKER; [ ] PACS BOMB; [X] PERISTALTIC PUMP; [X] FILTER (0.45 micron); [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER: [X] STREAM/ DITCH; [ ] LAKE/ POND; [ ] SEEP; [ ] MARSH; [X] OTHER South Ditch

DECON FLUIDS USED: [ ] DI WATER; [ ] POTABLE WATER; [ ] NONE

Notes: Up-stream of location PZ-17RRR

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS: ODOR _____ COLOR _____

TYPE OF SEDIMENT: [ ] ORGANIC; [ ] SAND; [ ] GRAVEL; [ ] CLAY; [ ] OTHER_____

EQUIPMENT FOR COLLECTION: [ ] HAND AUGER; [ ] S.S. SPOON; [ ] ALUMINIUM PAN; [ ] DREDGE; [ ] OTHER _____

DECON FLUIDS USED: [ ] DI WATER; [ ] POTABLE WATER; [ ] LIQUINOX; [ ] OTHER _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

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Prepared by: SAM
Checked by: CTM

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FIELD DATA RECORD - SEDIMENT

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SD1 | ACTIVITY TIME: START 11:25 END 11:35 | BOTTLE TIME: 11:30

QC SAMPLES COLLECTED: MS/ MSD

SURFACE WATER DATA

WATER DEPTH AT LOCATION: ft. | SPEC. COND: µs/cm

DEPTH OF SAMPLE FROM SURFACE: ft. | D.O.: mg/L

TEMPERATURE: DEG C | SALINITY: --- %

TURBIDITY: NTU | ORP: mV

pH: UNITS

EQUIPMENT USED: [ ] BEAKER [ ] PACS BOMB [ ] PERISTALTIC PUMP [ ] FILTER (0.45 micron) [ ] LDPE Tubing & Silicon

TYPE OF SURFACE WATER: [ ] STREAM/ RIVER [ ] LAKE/ POND [ ] SEEP [ ] MARSH [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER [ ] POTABLE WATER [ ] NONE

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH 0.0 ft. | END DEPTH 0.5 ft.

TYPE OF SAMPLE: GRAB [X]

SAMPLE OBSERVATIONS

ODOR: Mild

COLOR: Dark Brown

TYPE OF SEDIMENT: [X] ORGANIC [X] SAND [X] GRAVEL [ ] CLAY [ ] OTHER

EQUIPMENT FOR COLLECTIC: [X] HAND AUGER [ ] S.S. SPOON [ ] S.S. BOWL [ ] DREDGE [ ] OTHER

DECON FLUIDS USED: [X] DI WATER [ ] POTABLE WATER [X] LIQUINOX [ ] OTHER

FLOC OBSERVED: | CLEAR OF LEAF LITTER: Yes | OBSERVATIONS:

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X]	% Solids / Moisture	160.3	4 DEG. C		[X]
[X]	Total Al, Cr, Fe	6010B	4 DEG. C	1 X 4 oz.	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES MS/ MSD Collected
SD-1 location mostly mud

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAM
Checked by: CTM

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FIELD DATA RECORD - SEDIMENT

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SD2 | ACTIVITY TIME: START 11:40 END 11:50 | BOTTLE TIME: 11:45

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION: ft. | SPEC. COND: µs/cm

DEPTH OF SAMPLE FROM SURFACE: ft. | D.O.: mg/L

TEMPERATURE: DEG C | SALINITY: --- %

TURBIDITY: NTU | ORP: mV

pH: UNITS

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [ ] PERISTALTIC PUMP
- [ ] FILTER (0.45 micron)
- [ ] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [ ] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH 0.0 ft. | END DEPTH 0.5 ft.

TYPE OF SAMPLE: GRAB [X]

SAMPLE OBSERVATIONS

ODOR: Mild

COLOR: Dark Brown

FLOC OBSERVED: | CLEAR OF LEAF LITTER: Yes | OBSERVATIONS:

TYPE OF SEDIMENT
- [X] ORGANIC
- [X] SAND
- [X] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTIC
- [X] HAND AUGER
- [ ] S.S. SPOON
- [ ] S.S. BOWL
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED
- [X] DI WATER
- [ ] POTABLE WATER
- [X] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X]	% Solids / Moisture	160.3	4 DEG. C		[X]
[X]	Total Al, Cr, Fe	6010B	4 DEG. C	1 X 4 oz.	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAM
Checked by: CTM

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FIELD DATA RECORD - SEDIMENT

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SD3 | ACTIVITY TIME: START 11:50 END 12:00 | BOTTLE TIME: 11:55

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION: ft. | SPEC. COND: µs/cm

DEPTH OF SAMPLE FROM SURFACE: ft. | D.O.: mg/L

TEMPERATURE: DEG C | SALINITY: --- %

TURBIDITY: NTU | ORP: mV

pH: UNITS

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [ ] PERISTALTIC PUMP
- [ ] FILTER (0.45 micron)
- [ ] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [ ] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH 0.0 ft. | END DEPTH 0.5 ft.

TYPE OF SAMPLE: GRAB [X]

SAMPLE OBSERVATIONS

ODOR: Mild

COLOR: Dark Brown

FLOC OBSERVED: | CLEAR OF LEAF LITTER: Yes | OBSERVATIONS:

TYPE OF SEDIMENT
- [X] ORGANIC
- [X] SAND
- [X] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTIC
- [X] HAND AUGER
- [ ] S.S. SPOON
- [ ] S.S. BOWL
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED
- [X] DI WATER
- [ ] POTABLE WATER
- [X] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X]	% Solids / Moisture	160.3	4 DEG. C		[X]
[X]	Total Al, Cr, Fe	6010B	4 DEG. C	1 X 4 oz.	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAM
Checked by: CTM

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FIELD DATA RECORD - SEDIMENT

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SD4 | ACTIVITY TIME: START 12:05 END 12:15 | BOTTLE TIME: 12:10

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION: ft. | SPEC. COND: µs/cm

DEPTH OF SAMPLE FROM SURFACE: ft. | D.O.: mg/L

TEMPERATURE: DEG C | SALINITY: --- %

TURBIDITY: NTU | ORP: mV

pH: UNITS

EQUIPMENT USED: [ ] BEAKER; [ ] PACS BOMB; [ ] PERISTALTIC PUMP; [ ] FILTER (0.45 micron); [ ] LDPE Tubing & Silicon

TYPE OF SURFACE WATER: [ ] STREAM/ RIVER; [ ] LAKE/ POND; [ ] SEEP; [ ] MARSH; [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER; [ ] POTABLE WATER; [ ] NONE

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH 0.0 ft.; END DEPTH 0.5 ft.

TYPE OF SAMPLE: GRAB [X]

SAMPLE OBSERVATIONS

ODOR: Mild

COLOR: Dark Brown

TYPE OF SEDIMENT: [X] ORGANIC; [X] SAND; [X] GRAVEL; [ ] CLAY; [ ] OTHER

EQUIPMENT FOR COLLECTIC: [X] HAND AUGER; [ ] S.S. SPOON; [ ] S.S. BOWL; [ ] DREDGE; [ ] OTHER

DECON FLUIDS USED: [X] DI WATER; [ ] POTABLE WATER; [X] LIQUINOX; [ ] OTHER

FLOC OBSERVED: | CLEAR OF LEAF LITTER: Yes | OBSERVATIONS:

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X]	% Solids / Moisture	160.3	4 DEG. C		[X]
[X]	Total Al, Cr, Fe	6010B	4 DEG. C	1 X 4 oz.	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAM
Checked by: CTM

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FIELD DATA RECORD - SEDIMENT

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 12/4/2018

FIELD SAMPLE ID: OC-SD5 | ACTIVITY TIME: START 12:20 END 12:30 | BOTTLE TIME: 12:25

QC SAMPLES COLLECTED: DUP

SURFACE WATER DATA

WATER DEPTH AT LOCATION: ft. | SPEC. COND: µs/cm

DEPTH OF SAMPLE FROM SURFACE: ft. | D.O.: mg/L

TEMPERATURE: DEG C | SALINITY: --- %

TURBIDITY: NTU | ORP: mV

pH: UNITS

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [ ] PERISTALTIC PUMP
- [ ] FILTER (0.45 micron)
- [ ] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [ ] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH 0.0 ft. | END DEPTH 0.5 ft.

TYPE OF SAMPLE: GRAB X

SAMPLE OBSERVATIONS

ODOR: Mild

COLOR: Dark Brown

FLOC OBSERVED: | CLEAR OF LEAF LITTER: Yes | OBSERVATIONS:

TYPE OF SEDIMENT
- [X] ORGANIC
- [X] SAND
- [X] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTIC
- [X] HAND AUGER
- [ ] S.S. SPOON
- [ ] S.S. BOWL
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED
- [X] DI WATER
- [ ] POTABLE WATER
- [X] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X]	% Solids / Moisture	160.3	4 DEG. C		[X]
[X]	Total Al, Cr, Fe	6010B	4 DEG. C	1 X 4 oz.	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES DUP Collected

SIGNATURE: Field Form w/ Signature on File

Sampled by: BEG
Prepared by: SAM
Checked by: CTM

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\2018 Quarterly\4th Quarter\Notes\Nov 2018 Sed FDRs.xls

Appendix B

Chain of Custody Records

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

360325-Boston

Chain of Custody Record

360325-Boston

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-121082-24695.1
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 3
Company: Olin Corporation			480-145365 COC	Job #:
Address: 51 Eames street	Due Date Requested:			
City: Wilmington	TAT Requested (days):			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Groundwater Semi-Annual	Project #: 48006612			
Site: Massachusetts	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA

M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Chloride & Sulfate	350.1 - Nitrogen, Ammonia	6010MCP - Diss. Al, Cr	2510B - Specific Conductance	Total Number of containers	Special Instructions/Note:
				Preservation Code:			N	S	D	N		
OC-GW-10S	11-15-18	8:20	G	Water	✓		✓	✓	✓	✓	4	
OC-GW-201S	11-15-18	10:55	G	Water	✓		✓	✓	✓	✓	4	
OC-GW-24	11-15-18	10:15	G	Water	✓		✓	✓	✓	✓	4	
~~OC-GW-28~~				Water								
OC-GW-34D	11-15-18	11:40	G	Water	✓		✓	✓	✓	✓	4	
OC-GW-34SR	11-15-18	10:55	G	Water	✓		✓	✓	✓	✓	4	
OC-GW-35S	11-15-18	9:50	G	Water	✓		✓	✓	✓	✓	4	
~~OC-GW-42S~~				Water								
~~OC-GW-43SR~~				Water								
OC-GW-76S	11-15-18	8:55	G	Water	✓		✓	✓	✓	✓	4	
OC-GW-CA-1	11-15-18	8:55	G	Water	✓		✓	✓	✓	✓	4	

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ______ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	11-15-18		[signature]	11-15-18 1350	TA
[signature]	11-15-18 1800	TA	Loran Velezone	11-16-18 0800	TAB

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.0 #0

Ver: 08/04/2016

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12/4/2018

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Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-121082-24695.2
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com		Page: Page 2 of 3
Company: Olin Corporation				Job #:
Address: 51 Eames street	Due Date Requested:			
City: Wilmington	TAT Requested (days):			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Groundwater Semi-Annual	Project #: 48006612			
Site: Massachusetts	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Chloride & Sulfate	350.1 - Nitrogen, Ammonia	6010MCP - Diss. Al, Cr	2510B - Specific Conductance	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	S	D	N		
DUP GW 2021	11-14-18	8:45	G	Water	✓		1	1	1	1	4	
GW 2021 MS	11-14-18	8:45		Water	✓		1	1	1	1	4	
GW 2021 MSD	11-14-18	8:45		Water	✓		1	1	1	1	4	
OC-GW-202S	11-14-18	9:55		Water	✓		1	1	1	1	4	
OC-202D	11-14-18	8:45		Water	✓		1	1	1	1	4	
OC-GW-25	11-15-18	9:40		Water	✓		1	1	1	1	4	
OC-GW-78S	11-14-18	9:50		Water	✓		1	1	1	1	4	
OC-GW-79S	11-14-18	11:00		Water	✓		1	1	1	1	4	
OC-PZ16RRR	11-14-18	11:30		Water	✓		1	1	1	1	4	
OC-PZ-17RRR	11-14-18	10:25	✓	Water	✓		1	1	1	1	4	
OC-PZ18R	11-14-18	10:50		Water		✓	1	1	1	1	4	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		11-15-18			11-15-18 1818	
2		11-15-18 1818		Lorau Velevenc	11-16-18 0800	
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 2.0 #1

Ver: 08/04/2016

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Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: BRian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-121082-24695.3
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com		Page: Page 3 of 3
Company: Olin Corporation				Job #:
Address: 51 Eames street	Due Date Requested:			
City: Wilmington	TAT Requested (days):			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Groundwater Semi-Annual	Project #: 48006612			
Site: Massachusetts	SSOW#:			

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Chloride & Sulfate	350.1 - Nitrogen, Ammonia	6010MCP - Diss. Al, Cr	2510B - Specific Conductance	Total Number of containers	Special Instructions/Note:
				Preservation Code:			N	S	D	N		
OC-PZ-24	11-14-18	9:15	G	Water	–		1	1	1	1	4	
OC-PZ-25	11-14-18	8:30	G	Water	–		1	1	1	1	4	
~~DUP~~				Water								
~~MS~~				Water								
~~MSD~~				Water								
				Water								
				Water								

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)
Other:

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ______ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Relinquished by: [signature]	Date/Time: 11-15-18	Company:	Received by: [signature]	Date/Time: 11-15-18 1350	Company: TA
Relinquished by: [signature]	Date/Time: 11-15-18 1800	Company: TA	Received by: Loreau Velecorre	Date/Time: 11-16-18 0600	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.0 #1

Ver: 08/04/2016

14 13 12 11 10 9 8 7 6 5 4 3 2 1

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Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-121082-24695
Client Contact: Mr. Brian Guichard	Phone:	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 3
Company: Olin Corporation		**Analysis Requested**		Job #:
Address: 51 Eames street	**Due Date Requested:**			480-145916 COC
City: Wilmington	**TAT Requested (days):**			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Groundwater Semi-Annual	Project #: 48006612			
Site: Massachusetts	SSOW#:			

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Chloride & Sulfate	350.1 - Nitrogen, Ammonia	6010MCP - Diss. Al, Cr	2510B - Specific Conductance	Total Number of containers	Special Instructions/Note:
				Preservation Code:			N	S	D	N		
~~OC-GW-10S~~				Water								
~~OC-GW-20TS~~				Water								
~~OC-GW-24~~				Water								
~~OC-GW-26~~				Water								
~~OC-GW-34D~~				Water								
~~OC-GW-34SR~~				Water								
~~OC-GW-35S~~				Water								
OC-GW-42S (mpd port 15)	11-28-18	9:45		Water	✓		1	1	1	1	4	
OC-GW-43SR	11-28-18	8:40	G	Water	✓		1	1	1	1	4	
~~OC-GW-76S~~				Water								
~~OC-GW-CA-1~~				Water								

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For ____ Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:		Method of Shipment:	
Relinquished by:	Date/Time: 11-28-18	Company: TA	Received by:	Date/Time: 11-28-18 1440	Company: TA
Relinquished by:	Date/Time: 11-28-18 1800	Company: TA	Received by: Chumkow Ckolb	Date/Time: 11/29/18 0100	Company: TA
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.2 #1 ICE

Ver: 08/04/2016

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360325-Boston 360325-Boston

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-121082-24695.2
Client Contact: Mr. Brian Guichard	Phone: 9736586121	E-Mail: becky.mason@testamericainc.com		Page: Page 2 of 3
Company: Olin Corporation				Job #:
Address: 51 Eames street	Due Date Requested:			
City: Wilmington	TAT Requested (days):			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Groundwater Semi-Annual	Project #: 48006612			
Site: Massachusetts	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wastefoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Chloride & Sulfate	350.1 - Nitrogen, Ammonia	6010/MCP - Diss. Al, Cr	2510B - Specific Conductance	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	S	D	N		
DUP GW 43SR	11-28-18	8:40	G	Water	✓		1	1	1	1	4	
GW 43SR MS	11-28-18	8:40	G	Water	✓		1	1	1	1	4	
GW 43SR MSD	11-28-18	8:40	G	Water	✓		1	1	1	1	4	
~~OC-GW-202S~~				Water								
~~OC-202D~~				Water								
~~OC-GW-25~~				Water								
~~OC-GW-78S~~				Water								
~~OC-GW-79S~~				Water								
~~OC-PZ16RRR~~				Water								
~~OC-PZ-17RRR~~				Water								
~~OC-PZ18R~~				Water								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		11-28-18 1410			11-28-18 1410	
2		11-28-18 1800			11/29/18 0100	TA
3						

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 3.2 #1 IC

Ver: 08/04/2016

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360325-Boston

Chain of Custody Record

360325-Boston

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Cashwell	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-1210
Client Contact: Mr. James Cashwell	Phone: 978 658 6181	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of
Company: Olin Corporation				Job #:

Address: PO BOX 248	Due Date Requested:	Analysis Requested
City: Charleston	TAT Requested (days):	
State, Zip: TN, 37310-0248		
Phone: 423-336-4012(Tel)	PO #:	
Email: jmcashwell@olin.com	WO #:	
Project Name: Olin Wilington AnnualPlant B Event Desc: Plant B quarterly(Marc	Project #: 48006612	
Site: Massachusetts	SSOW#:	

Preservation
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - Di Water
K - EDTA
L - EDA
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)
Other:

480-145765 COC

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	350.1 - Ammonia	6010MCP - Iron Dissolved	MAVPH - VPH	8260MCP - VOC TMPs	8270_LL_MCP - SVOC NDPA/BEHP	SM4500_H+ - pH	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	S	D	A	A	N	N	X	
~~OC-B-03~~				Water										
OC-GW-101	11-27-18	10:05		Water	✓		1	1	3	3	2	1	11	
~~OC-GW-13~~				Water										
OC-IW-10	11-27-18	12:15		Water	✓		1	1	3	3	2	1	11	
OC-IW-6	11-27-18	10:00		Water	✓		1	1	3	3	2	1	11	
~~OC-GW-16R~~				Water										
~~OC-GW-16R MS~~				Water										
~~OC-GW-16R MSD~~				Water										
~~DUP~~				Water										
				Water										

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 11-27-18	Company	Received by:	Date/Time: 11-28-18 1100	Company
Relinquished by:	Date/Time: 11-27-18 1700	Company	Received by: Lorraine Velazquez	Date/Time: 11/28/18 0100	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 0.7 #1 0.5 #1

Ver: 08/04/2016

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360325-Boston

Chain of Custody Record

360325-Boston

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-122051-28004.1
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Olin Corporation				Job #:
Address: 51 Eames street	Due Date Requested:			
City: Wilmington	TAT Requested (days):			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Chemical Wilmington MA	Project #: 48006612			
Site: Massachusetts	SSOW#:			

Analysis Requested

Preservation Codes: 480-145767 COC

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	350.1 - Nitrogen, Ammonia	MAVPH - MA VPH	8260MCP - VOC 8260 Olin list	8270_LL_MCP - SVOC Olin List	MAEPH - MA EPH	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	S	A	A	N	A	X	
IW-6	11-27-18	10:00	G	Water			1	3	3	2	2	11	
GW 101	11-27-18	10:05	G	Water			1	3	3	2	2	11	
IW-10	11-27-18	12:15	G	Water			1	3	3	2	2	11	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		11-27-18			11.27.18 1400	TA
2	Relinquished by:	Date/Time: 11-27-18 1800	Company	Received by: Loran Valverde	Date/Time: 11/28/18 0700	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 1.2 #1

Ver: 08/04/2016

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360325-Boston 360325-Boston

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIR

480-145914 COC

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-121085-24697.
Client Contact: Mr. James Cashwell	Phone: 9786586171	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Olin Corporation				Job #:
Address: PO BOX 248	Due Date Requested:			
City: Charleston	TAT Requested (days):			
State, Zip: TN, 37310-0248				
Phone: 423-336-4012(Tel)	PO #:			
Email: jmcashwell@olin.com	WO #:			
Project Name: Olin Wilington AnnualPlant B Event Desc: Plant B quarterly(Marc	Project #: 48006612			
Site: Massachusetts	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	350.1 - Ammonia	6010MCP - Iron Dissolved	MAVPH - VPH	8260MCP - VOC TMPs	8270_LL_MCP - SVOC NDPA/BEHP	SM4500_H+ - pH	Total Number of containers	Special Instructions/Note:
			Preservation Code:				S	D	A	A	N	N		
OC-B-03	11-28-18	9:15	G	Water	✓		1	1	3	3	2	1	11	
~~OC-GW-101~~				Water										
~~OC-GW-13~~ → YES				Water										
OC-IW-10 → NO	11-28-18	10:40	G	Water	✓		1	1	3	3	2	1	11	
~~OC-IW-6~~				Water										
OC-GW-16R	11-28-18	9:45	G	Water	✓		1	1	3	3	2	1	11	
OC-GW-16R MS	11-28-18	9:45	G	Water	✓		1	1	3	3	2	1	11	
OC-GW-16R MSD	11-28-18	9:45	G	Water	✓		1	1	3	3	2	1	11	
DUP GW 16R	11-28-18	9:45	G	Water	✓		1	1	3	3	2	1	11	
				Water										

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		11-28-18			11-28-18 1700	
2		11-28-18 1800		Christian Ciko	11/29/18 0100	TA
3						

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.2 3.0 #1 ICE

Ver: 08/04/2016

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

360325-Boston

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-121083-22978.1
Client Contact: Mr. Brian Guichard	Phone: 978 658 6121	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Olin Corporation		**Analysis Requested**		Job #:
Address: 51 Eames street	**Due Date Requested:**			
City: Wilmington	**TAT Requested (days):**			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Olin Wilmington Surface Water Qurarterly	Project #: 48006612			
Site: Massachusetts	SSOW#:			

Preservation Codes:
A - HCL
B - NaOH
C - Zn Ac
D - Nitric
E - NaHS
F - MeOH
G - Amch
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)
...ahydrate
Other:

480-146199 COC

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	350.1 - Nitrogen, Ammonia	300.0_28D - Sulfate and Chloride	2510B, 353.2_Nitrite, Nitrate_Calc	6010MCP - Diss. Al, Cr, Na	6010MCP - Total Al, Cr, Na	Total Number of containers	Special Instructions/Note:
				Preservation Code:	X	X	S	N	N	D	D	X	
OC-ISCO1	12-4-18	11:15	G	Water	✓		1	1	2	1	1	6	
OC-ISCO2	|	8:50	G	Water	✓		1	1	2	1	1	6	
~~OC-ISCO3~~	|	—	G	Water			~~#~~					~~6~~	
OC-PZ-16RRRSW	|	9:15	G	Water	✓		1	1	2	1	1	6	
OC-PZ-17RRRSW	|	9:40	G	Water	✓		1	1	2	1	1	6	
OC-PZ-18RSW	|	10:25	G	Water	✓		1	1	2	1	1	6	
OC-SD-17	|	10:00	G	Water	✓		1	1	2	1	1	6	
DUP PZ-18RSW	|	10:25	G	Water	✓		1	1	2	1	1	6	
PZ-18RSW MS	|	10:25	G	Water	✓		1	1	2	1	1	6	
PZ-18RSW MSD	V	10:25	G	V	✓		1	1	2	1	1	6	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ________ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:	Time:		Method of Shipment:
Relinquished by: [signature]	Date/Time: 12-4-18 / 310	Company	Received by: [signature]	Date/Time: 12/4 1346	Company: TA
Relinquished by: [signature]	Date/Time: 12-4-18 1800	Company: TA	Received by: [signature]	Date/Time: 12-05-18 0100	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.8 #1

Ver: 08/04/2016

12/19/2018

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

360325-Boston

Chain of Custody Record

TestAmerica
THE LEADER IN ENVI

480-146179 COC

Client Information	Sampler: BRian Guichard	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-121084-11110
Client Contact: Mr. Brian Guichard	Phone: 9786586121	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Olin Corporation				Job #:

Address: 51 Eames street	Due Date Requested:	Analysis Requested
City: Wilmington	TAT Requested (days):	
State, Zip: MA, 01887		
Phone: 423-336-4012(Tel)	PO #: REWI0025	
Email: beguichard@olin.com	WO #:	
Project Name: Olin Chemical Annual Sediment	Project #: 48006612	
Site: Massachusetts	SSOW#:	

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010MCP, Moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N		
OC-SD1	12-4-18	11:30	G	Solid			1	1	
OC-SD2		11:45		Solid			1	1	
OC-SD3		11:55		Solid			1	1	
OC-SD4		12:10		Solid			1	1	
OC-SD5		12:25		Solid			1	1	
OC-SD-1 -MS		11:30		Solid			1	1	
OC-SD-1 -MSD		11:30		Solid			1	1	
OC-SD DUP		12:25		Solid			1	1	
				Solid					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 12-4-18 1310	Company	Received by:	Date/Time: 12-7-18 1340	Company
Relinquished by:	Date/Time: 12-4-18 1800	Company	Received by: Koray Valicente	Date/Time: 12-05-18 0100	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 6.2 #1

Ver: 08/04/2016

Appendix C

Cap Inspection Log

Olin Wilmington Containment Area Temporary Cap Inspection			
Date:	11 / 16 / 2018	**Inspector:**	Brian Guichard

Inspection Checklist

Feature	Observations		Notes
Drain	☐ Clear and Functioning	☐ Requires Maintenance	Date Cleared:
Sewn Seams	☐ Intact	☐ Requires Repairs	Date Repaired:
Ballast	☐ Intact	☐ Requires Replacement	Date Replaced:
Panels	X	Repair Locations	Date:
Ballest Locations	O	Locations Replaced or Repaired	— Seam Repair needed
Seam Locations	—	Locations Repaired	O Patch Areas not holding

Note: A large portion of repairs done earlier in the season do not seem to be adhering to the cap surface sufficiently. Patches completed on the older sections of the cap do not stick because of the thread bare areas around the patch, and a few of the patches on the newer section of the cap do not seem to adhere to the newer cap material because it is thin and flimsy and not a smooth surface to bond to. Smaller puncture hole patches seem to be faring a bit better.

Appendix A2

First Quarter 2019 Sampling Event

Interim Response Steps Field Activity Report First Quarter 2019 Sampling Event

Olin Chemical Superfund Site
Wilmington, Massachusetts
Project 6107190016

Prepared for:

Olin Corporation
3855 North Ocoee St., Suite 200, Cleveland, TN 37312

1-Jul-19

Interim Response Steps Field Activity Report
First Quarter 2019 Sampling Event

Olin Chemical Superfund Site
Wilmington, Massachusetts

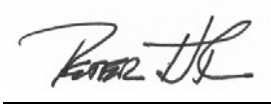
Project 6107190016

Prepared for:
Olin Corporation
3855 North Ocoee St., Suite 200, Cleveland, TN 37312

Prepared by:
Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
3rd Floor
Chelmsford, MA 01824
USA
T: 978-692-9090

1-Jul-19

Prepared and Reviewed by:



Peter H. Thompson
Senior Principal Hydrogeologist

Michael J. Murphy
Principal Scientist

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List of acronyms

Amec Foster Wheeler	Amec Foster Wheeler Environment and Infrastructure, Inc.
DO	Dissolved Oxygen
IRSWP	Interim Response Steps Work Plan
LNAPL	Light Non-Aqueous Phase Liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
NTU	Nephelometric Turbidity Units
ORP	Oxidation/Reduction Potential

RI/FS	Remedial Investigation/Feasibility Study
SC	Specific Conductivity
TAL	TestAmerica Laboratories, Inc.
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
Wood	Wood Environment & Infrastructure Solutions, Inc.

1.0 Introduction

On behalf of the Olin Corporation (Olin), Wood Environment & Infrastructure Solutions, Inc. (Wood) formerly Amec Foster Wheeler, presents this summary report for field activities completed in association with the First Quarter 2019 groundwater and surface water monitoring for the Slurry Wall/Cap Monitoring Program and the Plant B Monitoring Program. These activities were conducted consistent with the requirements and procedures contained in the Final Interim Response Steps Work Plan (IRSWP), Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts dated August 8, 2008 and the Volume IIIB, the Quality Assurance Project Plan, of the Final Remedial Investigation/Feasibility Study (RI/FS) Work Plan dated August 14, 2009 (MACTEC Engineering and Consulting, Inc. [MACTEC], 2009).

1.1 Limitations

This report, including its findings, opinions, and conclusions, is intended for the exclusive use and benefit of, and may be relied upon only by Olin Corporation and the United States Environmental Protection Agency (USEPA).

2.0 Slurry Wall/Cap monitoring program

The purpose of the Slurry Wall/Cap Monitoring Program is to monitor the concentrations of select constituents in groundwater and surface water in areas adjacent to and within the South Ditch of the former Olin Facility located at 51 Eames Street, Wilmington, Massachusetts.

The First Quarter 2019 groundwater and surface water monitoring program includes collecting groundwater level measurements from select monitoring wells and piezometers, collecting and analyzing groundwater samples from five monitoring wells and five piezometers, and collecting and analyzing surface water samples from seven locations within the East Ditch and South Ditch. Groundwater and surface water sample locations are listed in **Table 1** and shown on **Figure 1**. The groundwater and surface water sampling program is further described in the Final IRSWP (MACTEC, 2008), which has been approved by the USEPA.

2.1 Scope of Work

The Slurry Wall/Cap Monitoring Program for this sampling event consists of collecting groundwater level measurements in the vicinity of the South Ditch area; collecting and analyzing groundwater samples from the following monitoring wells: GW-25, GW-78S, GW-79S, GW-202S, and GW-202D; and piezometers: PZ-16RRR, PZ-17RRR, PZ-18R, PZ-24, and PZ-25; collecting and analyzing surface water samples from the following locations: ISCO-1, ISCO-2, ISCO-3, SD-17, PZ-16RRR, PZ-17RRR, and PZ-18R; and downloading water level and barometric pressure data from data loggers that have been installed in the following wells and piezometers: GW-10S, GW-35S, GW-CA1, GW-76S, GW-78S, GW-CA3S, GW-CA4S, PZ-24, PZ-25, and GW-6S. Monitoring wells, piezometers, and surface water sample locations are shown on **Figure 1**.

2.1.1 Groundwater Level Measurement

On April 5, 2019, Wood personnel completed a site reconnaissance of the monitoring well locations in the Slurry Wall/Cap Monitoring Program and collected groundwater level measurements. This included measuring depth to groundwater from 22 monitoring wells and piezometers using a water level meter. Groundwater level measurements and calculated groundwater elevations are summarized in **Table 2**.

2.1.2 Groundwater Sampling

On April 3 and 4, 2019, Wood personnel sampled groundwater from five monitoring wells and five piezometers using 2017 USEPA low stress (low flow) groundwater sampling methods.

Prior to low flow sampling, a YSI 556 multi-parameter water quality meter and Hach 2100Q turbidity meter were calibrated according to the instrument manufacturer's specifications using certified calibration solutions.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing at each monitoring location. During sampling activities, the purged groundwater was continuously monitored using the multi-parameter water quality meter for pH, temperature, specific conductivity (SC), dissolved oxygen (DO), oxidation/reduction potential (ORP), and turbidity. Well purging continued at each location until these field parameters stabilized as indicated in Appendix A of the IRSWP.

Piezometer wells PZ-16RRR and PZ-17RRR went dry upon purging and could not be sampled by low flow methods. These wells were purged dry and sampled upon recovery, which is the alternative approved method. Samples collected by this method typically have elevated turbidity. The final low flow purging field parameter measurements are presented in **Table 3**. Field data records for each groundwater monitoring location are attached in **Appendix A**.

Upon stabilization of groundwater parameters, groundwater samples were collected by directly filling the laboratory prepared sample bottles. A 0.45-micron pore diameter filter was used to field filter groundwater for dissolved metal analysis in accordance with the IRSWP. The samples were placed on ice and transferred to TestAmerica Laboratories, Inc. (TAL) of Buffalo, New York, under chain-of-custody for chemical analyses as summarized in **Table 4**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data are presented in the July 2019 Semi-Annual Status Report.

Purged groundwater from each monitoring well was collected in collapsible plastic containers, transported to the Block House building, adjacent to the Plant B groundwater treatment building, and containerized in a secured 55-gallon drum. Olin characterizes and disposes of that material in accordance with applicable regulations.

2.1.3 Surface Water Sampling

On April 2, 2019, Wood personnel collected seven surface water samples from downstream to upstream from the East Ditch and South Ditch. The locations are identified as ISCO-3, ISCO-2, PZ-16RRR, PZ-17RRR, SD-17, PZ-18R, and ISCO-1 as shown on **Figure 1**.

Before field activities began, a YSI multi-parameter water quality meter and Hach turbidity meter were properly calibrated to monitor surface water quality parameters at each location.

At each of the seven field locations, surface water parameter measurements (pH, temperature, SC, ORP, DO, and turbidity) were collected. Readings were collected by directly submersing the YSI probe into the surface water until parameter stabilization. The final surface water field parameters are summarized in **Table 5**. Field data records from each surface water sample location are attached in **Appendix A**.

Filtered surface water samples (for dissolved metals analysis) were collected by submerging dedicated tubing attached to a peristaltic pump into the water column at a depth that minimized entraining floating or suspended sediment. The peristaltic pump provides positive pressure for field filtering the water through the 0.45-micron pore diameter filter for dissolved metal analysis.

Surface water samples were collected by directly filling the laboratory prepared glassware. The samples were then placed on ice for delivery to TAL of Buffalo, New York, under chain-of-custody for chemical analyses summarized in **Table 6**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data are presented in the July 2019 Semi-Annual Status Report.

2.1.4 Data Logger Data Download

Data loggers are deployed in 10 monitoring wells and piezometers: GW-10S, GW-35S, GW-CA1, GW-76S, GW-78S, GW-CA3S, GW-CA4S, PZ-24, PZ-25, and GW-6S, to continuously monitor groundwater elevation proximate to the cap area. Wood E&IS downloaded data from the 10 data loggers, along with data from the barometric pressure data logger deployed in GW-35S. Downloaded data from the loggers are presented in the July 2019 Semi-Annual Status Report.

2.1.5 Cap Inspection

The temporary cap is composed of ten large and three small scrim reinforced polyethylene sheets of 8 mil thickness. These sheets were factory fabricated with double welded seams from smaller, narrower panels. The seams between the large sheets were field fabricated by folding and sewing the edges of the sheets together with an ultraviolet (UV) -resistant thread. The original temporary cap was installed in 2001 and consisted of a 6-mil thick sheet. Due to deterioration of the 6-mil sheet, an 8-mil thick cover was installed directly over the 6-mil cover and re-ballasted with sand bags to resist wind uplift.

Since November 2016, Olin on-site personnel have been conducting the cap inspections and integrating the inspections with the maintenance repair activities. Olin has reduced the official inspection frequency from quarterly to semi-annually with informal inspections to continue to ensure that any potential significant issues are addressed in a timely fashion. The semi-annual cap inspection and maintenance field data record is included as **Appendix C** and is summarized in the July 2019 Semi-Annual Status Report (No. 24).

3.0 Plant B monitoring program

The purpose of the Plant B groundwater sampling and analysis program is to monitor groundwater quality at select monitoring wells and conduct gauging activities to determine groundwater elevations and light non-aqueous phase liquid (LNAPL) thickness.

3.1 Scope of Work

The First Quarter 2019 Plant B Monitoring Program consisted of measuring groundwater levels in 28 monitoring wells within the Plant B area, gauging LNAPL thickness in monitoring wells where LNAPL was observed, and USEPA low stress (low flow) groundwater sampling at monitoring well: GW-16R. Groundwater monitoring wells from the Plant B Monitoring Program are shown on **Figure 2**.

3.1.1 Groundwater Level Measurements and LNAPL Gauging

On April 5, 2019, Olin personnel completed a site reconnaissance of the monitoring well locations in the Plant B Monitoring Program and collected groundwater level measurements and LNAPL thickness measurements. Depth to groundwater was measured in 28 monitoring wells using a water interface probe. For wells with observed LNAPL, LNAPL thickness was measured using an oil/water interface probe. Groundwater level measurements, groundwater elevations, and LNAPL thickness measurements are summarized in **Table 7**.

3.1.2 Groundwater Sampling

On April 3, 2019, Wood personnel sampled groundwater from monitoring well GW-16R following the 2017 USEPA low stress (low flow) groundwater sampling method.

Prior to low flow sampling, a YSI multi-parameter water quality meter and Hach turbidity meter were calibrated according to the instrument manufacturer's specifications using certified calibration solutions.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing at the sample location. During sampling activities, the purged groundwater was continuously monitored using the YSI multi-parameter water quality meter for pH, temperature, SC, DO, ORP, and turbidity. Well purging continued at the sample location until these field parameters stabilized as indicated in Appendix A of the IRSWP. The final low flow purging field parameter measurements are presented in **Table 8**. Field data records for each groundwater monitoring location are attached in **Appendix A**.

Upon groundwater parameter stabilization, groundwater samples were collected by directly filling the laboratory prepared glassware. The samples were placed on ice, and were transferred to TAL of Buffalo, New York, under chain-of-custody for chemical analyses as summarized in **Table 9**. Copies of the chain-of-custody documents are provided in **Appendix B**. Laboratory analytical data will be presented in the July 2019 Semi-Annual Status Report.

Purged groundwater from sampling activities was collected in collapsible plastic containers, transported to the Block House building, adjacent to the Plant B groundwater treatment building, and containerized in a secured 55-gallon drum. Olin characterizes and disposes of that material in accordance with applicable regulations.

4.0 References

MACTEC Engineering and Consulting, Inc. (MACTEC), August 8, 2008. Final Interim Response Steps Work Plan, Olin Chemical Superfund Site, Wilmington, Massachusetts.

MACTEC, August 14, 2009. Final RI/FS Work Plan, Olin Chemical Superfund Site, Wilmington, Massachusetts.

Tables

Table 1
Groundwater and Surface Water Sampling Locations
Slurry Wall/Cap Monitoring Program
First Quarter 2019 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Groundwater	Surface Water
GW-25	ISCO1
GW-78S	ISCO2
GW-79S	ISCO3
GW-202S	PZ-16RRR
GW-202D	PZ-17RRR
PZ-16RRR #	PZ-18R
PZ-17RRR #	SD-17
PZ-18R	
PZ-24	
PZ-25	
GW-16R ^	

Notes:
- Piezometer replaced in South Ditch
^ - Plant B Monitoring Well

Prepared by: CTM 5/10/2019
Checked by: SAM 5/10/2019

Table 2
Groundwater Elevations
Slurry Wall/Cap Monitoring Program
First Quarter 2019 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL ID	Reference Elevation	Depth to Water (1, 2)	Groundwater Elevation (3)	Notes	Date Measured
I.D.	(ft msl)	(ft)	(feet NGVD)		
GW-10S	89.79	8.29	81.50	TOC	4/5/2019
GW-24	83.43	2.07	81.36		4/5/2019
GW-25	85.97	4.92	81.05		4/5/2019
GW-26*	84.93	*	---	*	
GW-34D	90.36	7.59	82.77		4/5/2019
GW-34SR	89.13	6.29	82.84		4/5/2019
GW-35S	88.51	6.95	81.56		4/5/2019
GW-39 ^	83.64	3.13	80.51		4/5/2019
GW-42S**	84.18	**	---	**	
GW-43SR	87.86	6.30	81.56		4/5/2019
GW-55D	81.95	2.32	79.63		4/5/2019
GW-55S	81.70	1.90	79.80		4/5/2019
GW-76S	88.45	6.99	81.46	TOC	4/5/2019
GW-78S	84.89	4.20	80.69		4/5/2019
GW-79S	81.54	3.24	78.30		4/5/2019
GW-201S	83.29	3.39	79.90		4/5/2019
GW-202D	86.52	5.55	80.97		4/5/2019
GW-202S	86.97	6.18	80.79		4/5/2019
GW-CA1	88.01	6.52	81.49		4/5/2019
PZ-16RRR/IN	***	3.47	---		4/5/2019
PZ-16RRR/OUT (4)	***	3.60	---		4/5/2019
PZ-17RRR/IN	***	2.61	---		4/5/2019
PZ-17RRR/OUT (4)	***	3.50	---		4/5/2019
PZ-18R/IN	82.42	1.70	80.72		4/5/2019
PZ-18R/OUT (4)	82.42	1.91	80.51		4/5/2019
PZ-24	89.43	8.32	81.11		4/5/2019
PZ-25	88.90	8.03	80.87		4/5/2019

Prepared by: CTM 5/10/2019
Checked by: SAM 5/10/2019

Notes:
(1) - Measurement from top of PVC. If no PVC, measurement from TOC
(2) - Collected using a Solinst water interface probe
(3) - Groundwater Elevation = Reference Elevation - Depth to Water
(4) - Reported elevation of surface water adjacent to piezometer
TOC - Water level measurement taken from Top of Casing
* - Well removed for detention basin construction
** - Well destroyed during paving
*** - Piezometer replaced in South Ditch. Not surveyed
NGVD - National Geodetic Vertical Datum
msl - mean sea level
ft - feet
NM - not measured
^ - Well heaving

Table 3
Final Field Parameters for Groundwater Sampling
Slurry Wall/Cap Monitoring Program
First Quarter 2019 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Slurry Wall/Cap Monitoring Well Samples						**Quarterly Slurry Wall/Cap Piezometer Samples**				
Location ID	GW-25	GW-78S	GW-79S	GW-202S	GW-202D	PZ-16RRR	PZ-17RRR	PZ-18R	PZ-24	PZ-25
Date	4/4/2019	4/3/2019	4/4/2019	4/3/2019	4/3/2019	4/4/2019	4/3/2019	4/3/2019	4/3/2019	4/3/2019
Depth to Water (ft)	5.10	4.24	3.22	6.05	5.45	3.79	Dry	2.64	8.22	7.89
Temperature (° C)	8.64	9.36	5.05	7.99	8.90	5.72	14.10	6.35	7.34	8.49
Specific Conductivity (µS/cm)	1,193	1,272	2,138	962	2,439	1,861	1,262	4,767	1,814	1,322
pH (standard units)	7.10	6.74	6.38	6.13	5.04	6.60	7.02	6.35	6.61	6.36
Dissolved Oxygen (mg/L)	1.88	1.24	5.67	0.70	0.92	2.97	6.65	0.97	2.07	1.52
Turbidity (NTU)	2.42	5.63	7.26	3.91	75.4	2.47	21.7	6.63	3.45	3.51
ORP (millivolts)	-73.0	101.5	44.0	68.2	69.8	20.8	-3.7	38.3	-5.2	65.2

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mS/cm - milliSiemens per centimeter
1 µS/cm = 0.001 mS/cm
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts
Dry = purged dry and sampled upon recovery

Prepared by: CTM 5/10/2019
Checked by: SAM 5/10/2019

Table 4
Groundwater Laboratory Analytical Program
Slurry Wall/Cap Monitoring Program
First Quarter 2019 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.10	mg/L
Chloride	EPA 300.0	0.28	mg/L
Specific Conductivity	SM18 2510B	1.0	µmhos/cm
Sulfate	EPA 300.0	0.35	mg/L
Filtered Metals			
Aluminum, filtered	SW846 6010B	60	µg/L
Chromium, filtered	SW846 6010B	1.0	µg/L

Notes:
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µmhos/cm = µS/cm (microSiemens per centimeter)
1 µS/cm = 0.001 mS/cm (milliSiemens per centimeter)
µg/L - micrograms per liter

Prepared by: CTM 5/10/2019
Checked by: SAM 5/10/2019

Table 5
Final Field Parameters for Surface Water Sampling
Slurry Wall/Cap Monitoring Program
First Quarter 2019 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Surface Water Samples							
Location ID	ISCO1	ISCO2	ISCO3	PZ-16RRR	PZ-17RRR	PZ-18R	SD-17
Date	4/2/2019	4/2/2019	4/2/2019	4/2/2019	4/2/2019	4/2/2019	4/2/2019
Sample Depth of Water (ft)	0.30	0.25	0.30	0.20	0.25	0.30	0.20
Temperature (° C)	8.57	9.07	14.34	10.41	9.85	9.10	10.13
Specific Conductivity (µS/cm)	1,967	887	1,054	1,020	1,041	2,254	1,044
pH (standard units)	6.28	6.24	6.82	6.07	5.95	5.94	5.90
Dissolved Oxygen (mg/L)	11.15	12.40	11.50	10.57	11.13	11.21	8.83
Turbidity (NTU)	2.10	4.45	2.75	3.84	2.08	1.87	1.99
ORP (millivolts)	138.1	144.7	107.6	180.5	182.8	148.1	179.7

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mS/cm - milliSiemens per centimeter
1 µS/cm = 0.001 mS/cm
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts

Prepared by: CTM 5/10/2019
Checked by: SAM 5/10/2019

Table 6
Surface Water Analytical Program
Slurry Wall/Cap Monitoring Program
First Quarter 2019 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.10	mg/L
Nitrate	EPA 300.0	0.02	mg/L
Nitrite	EPA 300.0	0.02	mg/L
Chloride	EPA 300.0	0.28	mg/L
Specific Conductivity	SM18 2510B	1.0	µmhos/cm
Sulfate	EPA 300.0	0.35	mg/L
Total Metals			
Aluminum, Total	SW846 6010B	60	µg/L
Chromium, Total	SW846 6010B	1.0	µg/L
Sodium, Total	SW846 6010B	320	µg/L
Filtered Metals			
Aluminum, Filtered	SW846 6010B	60	µg/L
Chromium, Filtered	SW846 6010B	1.0	µg/L
Sodium, Filtered	SW846 6010B	320	µg/L

Notes:
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µmhos/cm = µS/cm (microSiemens per centimeter)
1 µS/cm = 0.001 mS/cm (milliSiemens per centimeter)
µg/L - micrograms per liter

Prepared by: CTM 5/10/2019
Checked by: SAM 5/10/2019

Table 7
Groundwater Elevations
Plant B Monitoring Program
First Quarter 2019 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL ID	Reference Elevation (1)	Depth to Water (2)	Depth to Product (3)	Product Thickness (4)	Groundwater Elevation (5)	Date Measured
I.D.	(ft msl)	(ft)	(ft)	(ft)	(feet NGVD)	
B-2	90.48	11.46	NPD	NA	79.02	4/5/2019
B-3	90.32	10.82	NPD	NA	79.50	4/5/2019
B-5R	91.38	11.13	NPD	NA	80.25	4/5/2019
B-7A	88.81	7.71	NPD	NA	81.10	4/5/2019
B-17	91.55	9.11	NPD	NA	82.44	4/5/2019
GW-13	90.57	11.15	NPD	NA	79.42	4/5/2019
GW-14	88.70	8.95	NPD	NA	79.75	4/5/2019
GW-15	90.01	8.22	NPD	NA	81.79	4/5/2019
GW-16R	92.46	10.52	NPD	NA	81.94	4/5/2019
GW-23	91.04	11.57	11.55	0.02	79.49	4/5/2019
GW-52S	87.95	8.24	NPD	NA	79.71	4/5/2019
GW-100	90.15	11.14	NPD	NA	79.01	4/5/2019
GW-101	90.14	11.14	NPD	NA	79.00	4/5/2019
GW-102	89.00	10.01	NPD	NA	78.99	4/5/2019
IW-1	90.71	11.23	NPD	NA	79.48	4/5/2019
IW-2	90.53	11.20	NPD	NA	79.33	4/5/2019
IW-3	90.76	11.35	NPD	NA	79.41	4/5/2019
IW-6	89.15	10.31	NPD	NA	78.84	4/5/2019
IW-7	90.10	11.03	NPD	NA	79.07	4/5/2019
IW-8	89.94	10.87	NPD	NA	79.07	4/5/2019
IW-9	89.78	10.63	NPD	NA	79.15	4/5/2019
IW-10	90.43	11.29	NPD	NA	79.14	4/5/2019
IW-11	89.92	10.89	NPD	NA	79.03	4/5/2019
IW-12	90.31	11.33	NPD	NA	78.98	4/5/2019
IW-13	89.90	10.68	NPD	NA	79.22	4/5/2019
PID	89.97	10.89	NPD	NA	79.08	4/5/2019
P5	90.45	11.28	11.27	0.01	79.18	4/5/2019
12-IN	89.84	10.50	NPD	NA	79.34	4/5/2019

Notes:

Prepared by: CTM 5/10/2019

Checked by: SAM 5/10/2019

(1) - Reference elevations surveyed 11/97. New TOC survey by Dana Perkins 4-5/98

(2) - Top of PVC. If no PVC, measurement from top of steel casing

(3) - Collected using a Solinst water interface probe or Geotech oil/water interface probe

(4) - If sheen is noted, a product thickness of 0.01 feet will be used to calculate the groundwater elevation

(5) - Groundwater Elevation = Reference Elevation - (Depth to Water - (Product Thickness x 0.95))

TOC - Top of Casing

NPD - No Product Detected

NA - Not Applicable

NGVD - National Geodetic Vertical Datum

msl - mean sea level

ft - feet

East Ditch - No sheen noted; Observed OK

Table 8
Final Field Parameters for Groundwater Sampling
Plant B Monitoring Program
First Quarter 2019 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Plant B Monitoring Well Samples	
Location	GW-16R
Date	4/3/2019
Depth to Water (ft)	10.82
Temperature (° C)	7.71
Specific Conductivity (µS/cm)	184
pH (standard units)	6.39
Dissolved oxygen (mg/L)	0.72
Turbidity (NTU)	9.47
Oxidation Reduction Potential (mV)	18.6

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mS/cm - milliSiemens per centimeter
1 µS/cm = 0.001 mS/cm
mg/L - milligrams per liter
NTU - nephelometric turbidity units
ORP - Oxidation/Reduction Potential
mV - millivolts

Prepared by: CTM 5/10/2019
Checked by: SAM 5/10/2019

Table 9
Groundwater Laboratory Analytical Program
Plant B Monitoring Program
First Quarter 2019 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Volatile organic compounds (VOC)			
2,4,4-Trimethyl-1-pentene	SW846 8260B	0.40	µg/L
2,4,4-Trimethyl-2-pentene	SW846 8260B	0.43	µg/L
Semivolatile organic compounds (SVOC)			
N-nitrosodiphenylamine	SW846 8270C	0.07	µg/L
bis(2-ethylhexyl)phthalate	SW846 8270C	0.42	µg/L
Volatile Petroleum Hydrocarbons (VPH)			
C5-C8 Aliphatics	MA VPH	1.5	µg/L
C5-C8 Aliphatics, Unadjusted	MA VPH	1.5	µg/L
C9-C12 Aliphatics	MA VPH	1.5	µg/L
C9-C12 Aliphatics, Unadjusted	MA VPH	1.5	µg/L
C9-C10 Aromatics	MA VPH	0.50	µg/L
Methyl-tert-butyl-ether (MTBE)	MA VPH	0.25	µg/L
Benzene	MA VPH	0.25	µg/L
Ethylbenzene	MA VPH	0.25	µg/L
m,p-Xylene	MA VPH	0.50	µg/L
o-Xylene	MA VPH	0.25	µg/L
Toluene	MA VPH	0.25	µg/L
Naphthalene	MA VPH	0.25	µg/L
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.10	mg/L
pH	SM 4500 H+ B	0.10	SU
Filtered Metals			
Iron, Filtered	SW846 6010B	19	µg/L

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
SU - standard units

Prepared by: CTM 5/10/2019
Checked by: SAM 5/10/2019

Figures

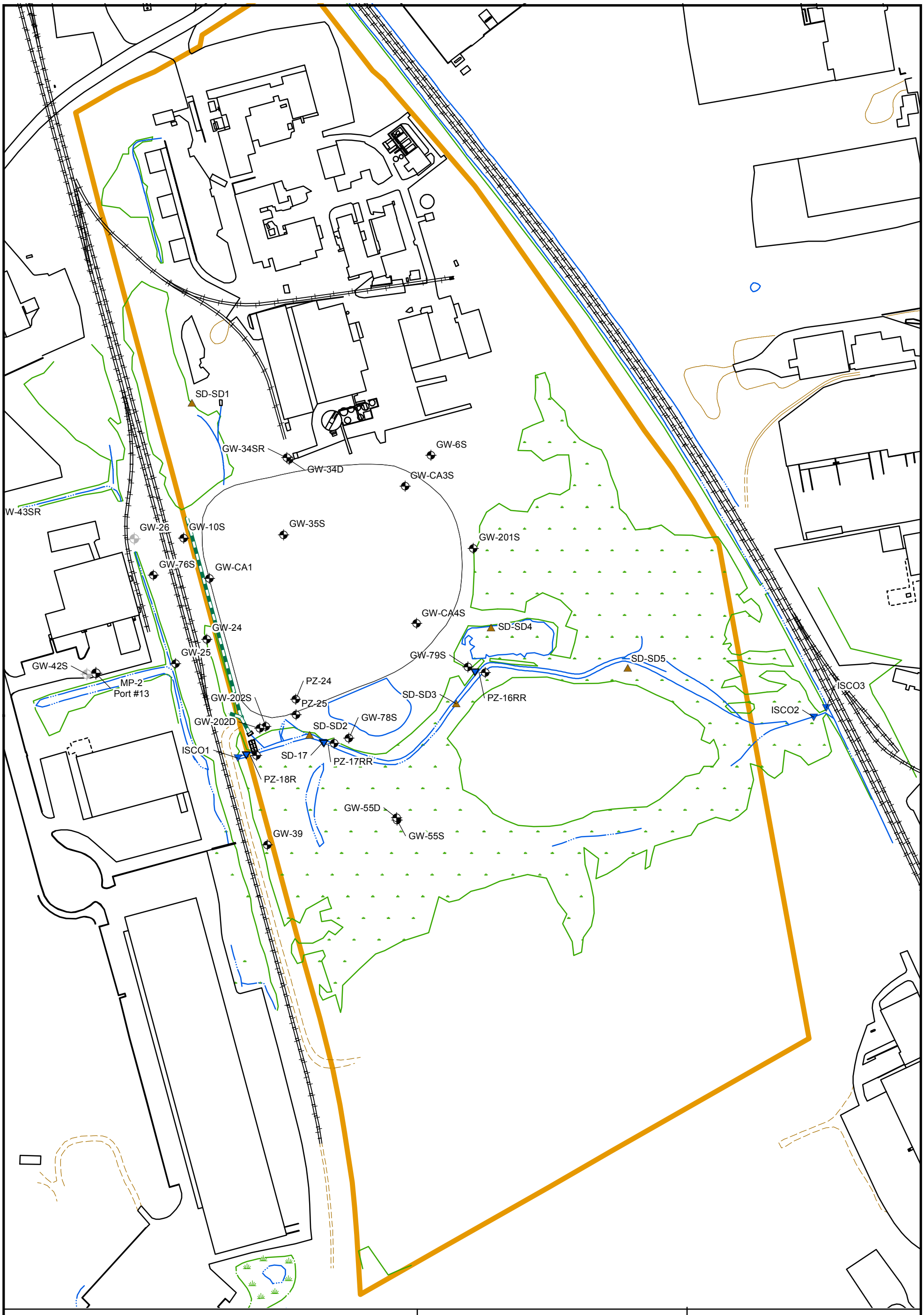
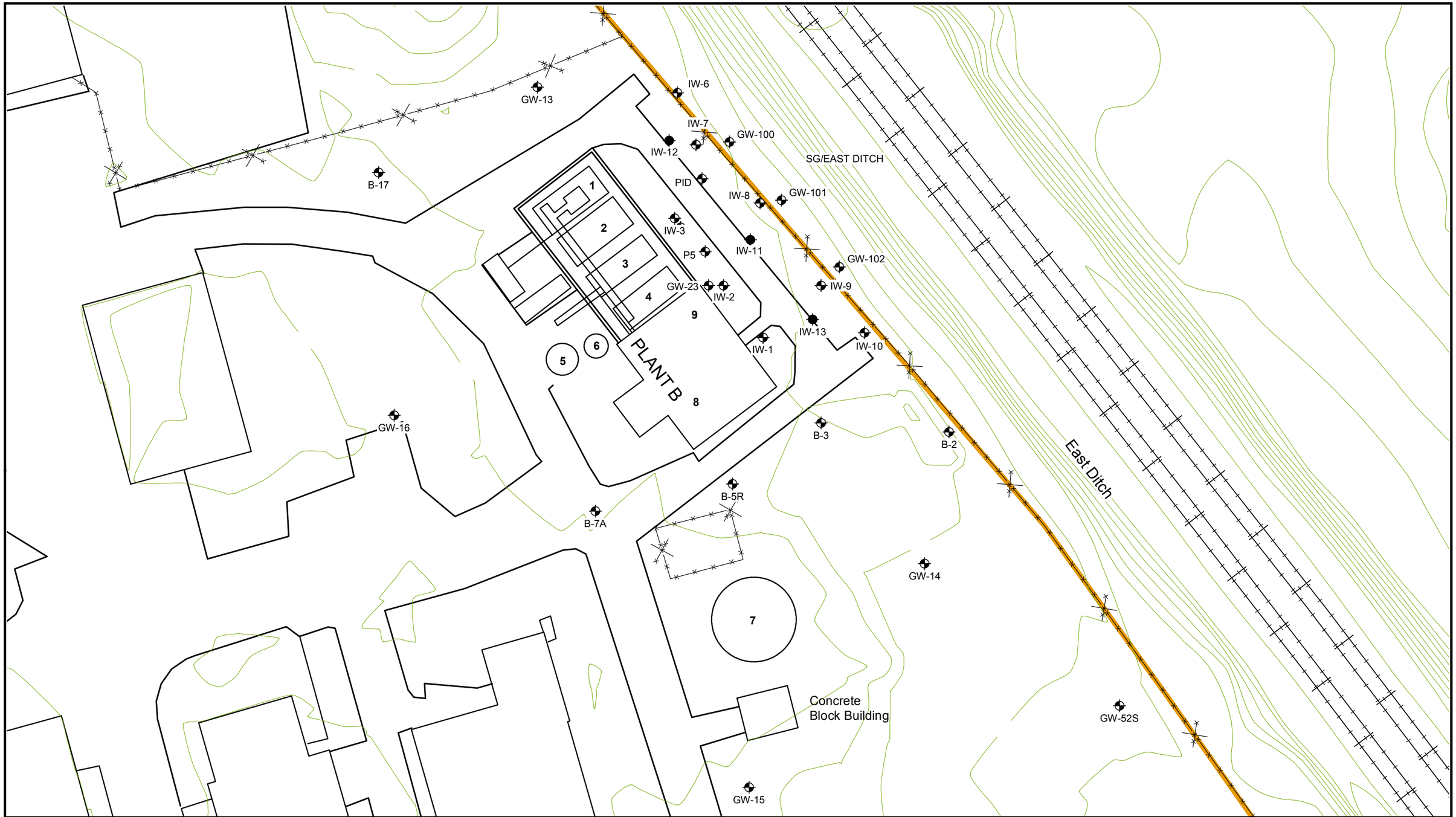


Figure 1
Slurry Wall / Cap Monitoring Program
Sample Locations

Interim Response Steps Field Activity Report
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/07/18 | Checked/Date: CTM 06/07/18

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd June 07, 2018 DWN: emily.gardiner CHKD: AKN



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Monitoring Well
- Recovery Well
- Elevation Contours

wood.
Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road
Chelmsford, MA 01824

N

0 15 30 60 Feet

Figure 2
Plant B Monitoring Program
Sampling Locations

Interim Response Steps Field Activity Report
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: EFG 06/07/18 | Checked/Date: CTM 06/07/18

Document: P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_11X17_LS.mxd PDF: P:\old_Wakefield_Data\projects\OLIN\Wilmington\GIS\Figures\Figure 3 - Plant B Monitoring Program Sampling Locations.pdf

Appendix A

Field Data Records and Field Instrument Calibration Records

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT NAME:	Olin Chemical Superfund Site	TASK NO:	DATE: 4/2/2019
PROJECT NUMBER:	6107190016	WOOD CREW:	SAM/CTM
PROJECT LOCATION:	Wilmington, MA	SAMPLER NAME:	Sam Mizusawa
WEATHER CONDITIONS (AM):	Sunny, cold, temps in ~ 20's	SAMPLER SIGNATURE:	Field Form w/ Signature on File
WEATHER CONDITIONS (PM):	Sunny, temps in ~ 50's	CHECKED BY: CTM	DATE: 4/9/2019

MULTI-PARAMETER WATER QUALITY METER

METER TYPE: YSI
MODEL NO.: 556 MPS
UNIT ID NO.: M015-11

AM CALIBRATION — **Start Time:** 7:00 **End Time:** 7:17

PM CALIBRATION CHECK — **Start Time:** 14:32 **End Time:** 14:45

	Units	Standard Value (AM)	Meter Value (AM)	*Acceptance Criteria (AM)	Standard Value (PM)	Meter Value (PM)	*Acceptance Criteria (PM)
pH (4)	SU	4.0	3.99	+/- 0.1 pH Units			
pH (7)	SU	7.0	7.00	+/- 0.1 pH Units	7.0	7.17	+/- 0.3 pH Units
pH (10)	SU	10.0	---	+/- 0.1 pH Units			
Redox	+/- mV	240	240.0	+/- 10 mV	240	244.6	+/- 10 mV
Sp. Conductivity	µS/cm	1413	1413	+/- 3% of standard	1413	1485	+/- 5% of standard
DO (saturated)	%	100	100.1	+/- 2% of standard		109.7	%
DO (saturated)	mg/L [1] (see Chart 1)	8.51	8.38	+/- 0.2 mg/L	9.18	10.02	+/- 0.5 mg/L of sat. value
DO (<0.1)	mg/L	<0.1	---	< 0.5 mg/L	DO (<0.1)	---	< 0.5 mg/L
Temperature	°C		24.14			21.49	°C
Baro. Press.	mmHg		770.8			767.1	mmHg

TURBIDITY METER

METER TYPE: Hach
MODEL NO.: 2100Q
UNIT ID NO.: M024-36

	Units	Standard Value	Meter Value	Standard Value (PM)	Meter Value (PM)	*Acceptance Criteria (PM)
Standard	NTU	10	9.86	10	10.2	+/- 0.3 NTU of stan.
Standard	NTU	20	20.0	20	22.0	+/- 5% of standard
Standard	NTU	100	98.9	100	104	+/- 5% of standard
Standard	NTU	800	781	800	805	+/- 5% of standard

PHOTOIONIZATION DETECTOR

METER TYPE:
MODEL NO.:
UNIT ID NO.:

	Units	Standard Value	Meter Value	Standard Value (PM)	Meter Value (PM)	*Acceptance Criteria (PM)
Background	ppmv	<0.1		<0.1		within 5 ppmv of BG
Span Gas	ppmv	100		100		+/- 10% of standard

O_2-LEL 4 GAS METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

	Units	Standard Value	Meter Value	Standard Value (PM)	Meter Value (PM)	*Acceptance Criteria (PM)
Methane	%	50		50		+/- 10% of standard
O_2	%	20.9		20.9		+/- 10% of standard
H_2S	ppmv	25		25		+/- 10% of standard
CO	ppmv	50		50		+/- 10% of standard

OTHER METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

See Notes Below for Additional Information

[X] Equipment calibrated within the Acceptance Criteria specified for each of the parameters listed above.

[ ] Equipment (not) calibrated within the Acceptance Criteria specified for each of the parameters listed above**.

MATERIALS RECORD

Deionized Water Source: Portland - FOS
Lot#/Date Produced:
Trip Blank Source: Lab
Sample Preservatives Source: Lab
Disposable Filter Type: 0.45µm
Calibration Fluids / Standard Source:
- DO Calibration Fluid (<0.1 mg/L): ---
- Other: ---
- Other: ---
- Other: ---

	Cal. Standard Lot Number	Exp. Date
pH (4)	8GC347	3/20
pH (7)	8GC117	3/20
pH (10)	---	---
ORP	2340	12/22
Conductivity	8GK308	11/19
10 Turb. Stan.	A8232	11/19
20 Turb. Stan.	A8239	12/19
100 Turb. Stan.	A8236	11/19
800 Turb. Stan.	A8236	11/19
PID Span Gas	---	---
O_2-LEL Span Gas	---	---
DO	9GA674	1/20

NOTES:

wood.

* = Unless otherwise noted, calibration procedures and acceptance criteria are in general accordance with USEPA Region 1 SOPs for Field Instrument Calibration (EQASOP-Field Calibration) and Low Stress Purging and Sampling (EQASOP-GW001), each dated 1/19/2010. Additional acceptance criteria obtained from instrument specific manufacturer recommendations.

** = If meter reading is not within acceptance criteria, clean/replace probe and re-calibrate, or use calibrated back-up meter if available. If project requirements necessitate use of the instrument, clearly document any deviations from acceptance criteria on all data sheets and log book entries.

1 = DO Saturated standard value is calculated based on Oxygen Solubility at Indicated Pressure Chart from the USEPA Region 1 SOP for Field Instrument Calibration (EQASOP-Field Calibration), dated 1/19/2010.

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT NAME:	Olin Chemical Superfund Site	TASK NO:	DATE: 4/3/2019
PROJECT NUMBER:	6107190016	WOOD CREW:	CHL
PROJECT LOCATION:	Wilmington, MA	SAMPLER NAME:	Charles Lyman
WEATHER CONDITIONS (AM):	Rain, breezey, cloudy, temps in mid ~ 30's	SAMPLER SIGNATURE:	Field Form w/ Signature on File
WEATHER CONDITIONS (PM):	Cloudy-sunny, temps in ~ 60's	CHECKED BY: CTM	DATE: 4/9/2019

MULTI-PARAMETER WATER QUALITY METER

METER TYPE: YSI
MODEL NO.: 556 MPS
UNIT ID NO.: M015-14

AM CALIBRATION — **Start Time:** 7:50 **End Time:** 8:10

PM CALIBRATION CHECK — **Start Time:** 15:50 **End Time:** 16:00

	Units	Standard Value	Meter Value	*Acceptance Criteria (AM)	Standard Value	Meter Value	*Acceptance Criteria (PM)
pH (4)	SU	4.0	4.00	+/- 0.1 pH Units			
pH (7)	SU	7.0	7.00	+/- 0.1 pH Units	7.0	7.01	+/- 0.3 pH Units
pH (10)	SU	10.0	---	+/- 0.1 pH Units			
Redox	+/- mV	240	240.0	+/- 10 mV	240	245.7	+/- 10 mV
Sp. Conductivity	µS/cm	1413	1413	+/- 3% of standard	1413	1415	+/- 5% of standard
DO (saturated)	%	100	99.6	+/- 2% of standard		99.7	%
DO (saturated)	mg/L[1] (see Chart 1)	7.81	7.82	+/- 0.2 mg/L	9.30	9.18	+/- 0.5 mg/L of sat. value
DO (<0.1)	mg/L	<0.1	0.21	< 0.5 mg/L	DO (<0.1)	0.18	< 0.5 mg/L
Temperature	°C		27.77			18.48	°C
Baro. Press.	mmHg		757.0			752.4	mmHg

TURBIDITY METER

METER TYPE: Hach
MODEL NO.: 2100Q
UNIT ID NO.: M024-31

	Units	Standard Value	Meter Value	Standard Value	Meter Value	*Acceptance Criteria (PM)
Standard	NTU	10	9.78	10	10.1	+/- 0.3 NTU of stan.
Standard	NTU	20	21.0	20	20.4	+/- 5% of standard
Standard	NTU	100	101	100	101	+/- 5% of standard
Standard	NTU	800	809	800	811	+/- 5% of standard

PHOTOIONIZATION DETECTOR

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Background	ppmv	<0.1		<0.1		within 5 ppmv of BG
Span Gas	ppmv	100		100		+/- 10% of standard

O_2-LEL 4 GAS METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Methane	%	50		50		+/- 10% of standard
O_2	%	20.9		20.9		+/- 10% of standard
H_2S	ppmv	25		25		+/- 10% of standard
CO	ppmv	50		50		+/- 10% of standard

OTHER METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

See Notes Below for Additional Information

[X] Equipment calibrated within the Acceptance Criteria specified for each of the parameters listed above.

[ ] Equipment (not) calibrated within the Acceptance Criteria specified for each of the parameters listed above**.

MATERIALS RECORD

Deionized Water Source: Portland - FOS
Lot#/Date Produced:
Trip Blank Source: Lab
Sample Preservatives Source: Lab
Disposable Filter Type: 0.45µm
Calibration Fluids / Standard Source:
- DO Calibration Fluid (<0.1 mg/L) ---
- Other ---
- Other ---
- Other ---

	Cal. Standard Lot Number	Exp. Date
pH (4)	8GC347	3/20
pH (7)	8GC117	3/20
pH (10)	---	---
ORP	2340	12/22
Conductivity	8GK308	11/19
10 Turb. Stan.	A8232	11/19
20 Turb. Stan.	A8239	12/19
100 Turb. Stan.	A8236	11/19
800 Turb. Stan.	A8236	11/19
PID Span Gas	---	---
O_2-LEL Span Gas	---	---
DO	9GA674	1/20

NOTES:

wood.

* = Unless otherwise noted, calibration procedures and acceptance criteria are in general accordance with USEPA Region 1 SOPs for Field Instrument Calibration (EQASOP-Field Calibration) and Low Stress Purging and Sampling (EQASOP-GW001), each dated 1/19/2010. Additional acceptance criteria obtained from instrument specific manufacturer recommendations.

** = If meter reading is not within acceptance criteria, clean/replace probe and re-calibrate, or use calibrated back-up meter if available. If project requirements necessitate use of the instrument, clearly document any deviations from acceptance criteria on all data sheets and log book entries.

1 = DO Saturated standard value is calculated based on Oxygen Solubility at Indicated Pressure Chart from the USEPA Region 1 SOP for Field Instrument Calibration (EQASOP-Field Calibration), dated 1/19/2010.

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT NAME:	Olin Chemical Superfund Site	TASK NO:	DATE: 4/3/2019
PROJECT NUMBER:	6107190016	WOOD CREW:	SAM
PROJECT LOCATION:	Wilmington, MA	SAMPLER NAME:	Sam Mizusawa
WEATHER CONDITIONS (AM):	Rain, breezey, cloudy, temps in mid ~ 30's	SAMPLER SIGNATURE:	Field Form w/ Signature on File
WEATHER CONDITIONS (PM):	Cloudy-sunny, temps in ~ 60's	CHECKED BY: CTM	DATE: 4/9/2019

MULTI-PARAMETER WATER QUALITY METER

METER TYPE: YSI
MODEL NO.: 556 MPS
UNIT ID NO.: M015-11

	Units	AM CALIBRATION Standard Value (Start Time: 7:14 End Time: 7:33)	AM CALIBRATION Meter Value	*Acceptance Criteria (AM)	PM CALIBRATION CHECK Standard Value (Start Time: 15:40 End Time: 15:51)	PM CALIBRATION CHECK Meter Value	*Acceptance Criteria (PM)
pH (4)	SU	4.0	4.00	+/- 0.1 pH Units			
pH (7)	SU	7.0	7.00	+/- 0.1 pH Units	7.0	7.04	+/- 0.3 pH Units
pH (10)	SU	10.0	---	+/- 0.1 pH Units			
Redox	+/- mV	240	240.0	+/- 10 mV	240	237.9	+/- 10 mV
Sp. Conductivity	µS/cm	1413	1413	+/- 3% of standard	1413	1482	+/- 5% of standard
DO (saturated)	%	100	100.0	+/- 2% of standard		97.6	%
DO (saturated)	mg/L[1] (see Chart 1)	8.24	8.17	+/- 0.2 mg/L	8.28	8.24	+/- 0.5 mg/L of sat. value
DO (<0.1)	mg/L	<0.1	0.24	< 0.5 mg/L	DO (<0.1)	0.25	< 0.5 mg/L
Temperature	°C		25.15			23.62	°C
Baro. Press.	mmHg		759.8			752.1	mmHg

TURBIDITY METER

METER TYPE: Hach
MODEL NO.: 2100Q
UNIT ID NO.: M024-36

	Units	Standard Value	Meter Value	Standard Value	Meter Value	*Acceptance Criteria (PM)
Standard	NTU	10	9.80	10	10.3	+/- 0.3 NTU of stan.
Standard	NTU	20	19.5	20	20.2	+/- 5% of standard
Standard	NTU	100	98.6	100	102	+/- 5% of standard
Standard	NTU	800	789	800	807	+/- 5% of standard

PHOTOIONIZATION DETECTOR

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Background	ppmv	<0.1		<0.1		within 5 ppmv of BG
Span Gas	ppmv	100		100		+/- 10% of standard

O_2-LEL 4 GAS METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Methane	%	50		50		+/- 10% of standard
O_2	%	20.9		20.9		+/- 10% of standard
H_2S	ppmv	25		25		+/- 10% of standard
CO	ppmv	50		50		+/- 10% of standard

OTHER METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

See Notes Below for Additional Information

[X] Equipment calibrated within the Acceptance Criteria specified for each of the parameters listed above.

[ ] Equipment (not) calibrated within the Acceptance Criteria specified for each of the parameters listed above**.

MATERIALS RECORD

Deionized Water Source: Portland - FOS
Lot#/Date Produced:
Trip Blank Source: Lab
Sample Preservatives Source: Lab
Disposable Filter Type: 0.45µm
Calibration Fluids / Standard Source:
- DO Calibration Fluid (<0.1 mg/L): ---
- Other: ---
- Other: ---
- Other: ---

	Cal. Standard Lot Number	Exp. Date
pH (4)	8GC347	3/20
pH (7)	8GC117	3/20
pH (10)	---	---
ORP	2340	12/22
Conductivity	8GK308	11/19
10 Turb. Stan.	A8232	11/19
20 Turb. Stan.	A8239	12/19
100 Turb. Stan.	A8236	11/19
800 Turb. Stan.	A8236	11/19
PID Span Gas	---	---
O_2-LEL Span Gas	---	---
DO	9GA674	1/20

NOTES:

wood.

* = Unless otherwise noted, calibration procedures and acceptance criteria are in general accordance with USEPA Region 1 SOPs for Field Instrument Calibration (EQASOP-Field Calibration) and Low Stress Purging and Sampling (EQASOP-GW001), each dated 1/19/2010. Additional acceptance criteria obtained from instrument specific manufacturer recommendations.

** = If meter reading is not within acceptance criteria, clean/replace probe and re-calibrate, or use calibrated back-up meter if available. If project requirements necessitate use of the instrument, clearly document any deviations from acceptance criteria on all data sheets and log book entries.

1 = DO Saturated standard value is calculated based on Oxygen Solubility at Indicated Pressure Chart from the USEPA Region 1 SOP for Field Instrument Calibration (EQASOP-Field Calibration), dated 1/19/2010.

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT NAME:	Olin Chemical Superfund Site	TASK NO:	DATE: 4/3/2019
PROJECT NUMBER:	6107190016	WOOD CREW:	JJL
PROJECT LOCATION:	Wilmington, MA	SAMPLER NAME:	Jolene Lozewski
WEATHER CONDITIONS (AM):	Rain, breezey, cloudy, temps in mid ~ 30's	SAMPLER SIGNATURE:	Field Form w/ Signature on File
WEATHER CONDITIONS (PM):	Cloudy-sunny, temps in ~ 60's	CHECKED BY: CTM	DATE: 4/9/2019

MULTI-PARAMETER WATER QUALITY METER

METER TYPE: YSI
MODEL NO.: 556 MPS
UNIT ID NO.: M015-12

AM CALIBRATION — **Start Time:** 6:30 **End Time:** 7:00

PM CALIBRATION CHECK — **Start Time:** 15:55 **End Time:** 16:15

	Units	Standard Value	Meter Value	*Acceptance Criteria (AM)	Standard Value	Meter Value	*Acceptance Criteria (PM)
pH (4)	SU	4.0	4.00	+/- 0.1 pH Units			
pH (7)	SU	7.0	7.00	+/- 0.1 pH Units	7.0	7.15	+/- 0.3 pH Units
pH (10)	SU	10.0	---	+/- 0.1 pH Units			
Redox	+/- mV	240	240.0	+/- 10 mV	240	236.4	+/- 10 mV
Sp. Conductivity	µS/cm	1413	1413	+/- 3% of standard	1413	1445	+/- 5% of standard
DO (saturated)	%	100	99.6	+/- 2% of standard		106.3	%
DO (saturated)	mg/L[1] (see Chart 1)	7.63	7.66	+/- 0.2 mg/L	8.59	8.88	+/- 0.5 mg/L of sat. value
DO (<0.1)	mg/L	<0.1	0.30	< 0.5 mg/L	DO (<0.1)	0.20	< 0.5 mg/L
Temperature	°C		29.00			21.75	°C
Baro. Press.	mmHg		756.9			752.0	mmHg

TURBIDITY METER

METER TYPE: Hach
MODEL NO.: 2100Q
UNIT ID NO.: M024-27

	Units	Standard Value	Meter Value	Standard Value	Meter Value	*Acceptance Criteria (PM)
Standard	NTU	10	10.4	10	10.4	+/- 0.3 NTU of stan.
Standard	NTU	20	19.9	20	19.6	+/- 5% of standard
Standard	NTU	100	96.7	100	97.3	+/- 5% of standard
Standard	NTU	800	778	800	772	+/- 5% of standard

PHOTOIONIZATION DETECTOR

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Background	ppmv	<0.1		<0.1		within 5 ppmv of BG
Span Gas	ppmv	100		100		+/- 10% of standard

O_2-LEL 4 GAS METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Methane	%	50		50		+/- 10% of standard
O_2	%	20.9		20.9		+/- 10% of standard
H_2S	ppmv	25		25		+/- 10% of standard
CO	ppmv	50		50		+/- 10% of standard

OTHER METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

See Notes Below for Additional Information

[X] Equipment calibrated within the Acceptance Criteria specified for each of the parameters listed above.

[ ] Equipment (not) calibrated within the Acceptance Criteria specified for each of the parameters listed above**.

MATERIALS RECORD

Deionized Water Source: Portland - FOS
Lot#/Date Produced:
Trip Blank Source: Lab
Sample Preservatives Source: Lab
Disposable Filter Type: 0.45µm
Calibration Fluids / Standard Source:
- DO Calibration Fluid (<0.1 mg/L): ---
- Other: ---
- Other: ---
- Other: ---

	Cal. Standard Lot Number	Exp. Date
pH (4)	8GC347	3/20
pH (7)	8GC117	3/20
pH (10)	---	---
ORP	2340	12/22
Conductivity	8GK308	11/19
10 Turb. Stan.	A8232	11/19
20 Turb. Stan.	A8239	12/19
100 Turb. Stan.	A8236	11/19
800 Turb. Stan.	A8236	11/19
PID Span Gas	---	---
O_2-LEL Span Gas	---	---
DO	9GA674	1/20

NOTES:

wood.

* = Unless otherwise noted, calibration procedures and acceptance criteria are in general accordance with USEPA Region 1 SOPs for Field Instrument Calibration (EQASOP-Field Calibration) and Low Stress Purging and Sampling (EQASOP-GW001), each dated 1/19/2010. Additional acceptance criteria obtained from instrument specific manufacturer recommendations.

** = If meter reading is not within acceptance criteria, clean/replace probe and re-calibrate, or use calibrated back-up meter if available. If project requirements necessitate use of the instrument, clearly document any deviations from acceptance criteria on all data sheets and log book entries.

1 = DO Saturated standard value is calculated based on Oxygen Solubility at Indicated Pressure Chart from the USEPA Region 1 SOP for Field Instrument Calibration (EQASOP-Field Calibration), dated 1/19/2010.

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT NAME:	Olin Chemical Superfund Site	TASK NO:	DATE: 4/4/2019
PROJECT NUMBER:	6107190016	WOOD CREW:	SAM
PROJECT LOCATION:	Wilmington, MA	SAMPLER NAME:	Sam Mizusawa
WEATHER CONDITIONS (AM):	Sunny, temps in mid ~ 30's	SAMPLER SIGNATURE:	Field Form w/ Signature on File
WEATHER CONDITIONS (PM):	Sunny, windy, temps in high ~ 40's	CHECKED BY: CTM	DATE: 4/9/2019

MULTI-PARAMETER WATER QUALITY METER

METER TYPE: YSI
MODEL NO.: 556 MPS
UNIT ID NO.: M015-11

AM CALIBRATION — **Start Time:** 7:12 **End Time:** 7:27

PM CALIBRATION CHECK — **Start Time:** 15:40 **End Time:** 15:50

	Units	Standard Value	Meter Value	*Acceptance Criteria (AM)	Standard Value	Meter Value	*Acceptance Criteria (PM)
pH (4)	SU	4.0	4.00	+/- 0.1 pH Units			
pH (7)	SU	7.0	7.00	+/- 0.1 pH Units	7.0	7.07	+/- 0.3 pH Units
pH (10)	SU	10.0	---	+/- 0.1 pH Units			
Redox	+/- mV	240	240.0	+/- 10 mV	240	236.4	+/- 10 mV
Sp. Conductivity	µS/cm	1413	1412	+/- 3% of standard	1413	1462	+/- 5% of standard
DO (saturated)	%	100	100.7	+/- 2% of standard		103.8	%
DO (saturated)	mg/L [1] (see Chart 1)	8.30	8.31	+/- 0.2 mg/L	8.30	8.54	+/- 0.5 mg/L of sat. value
DO (<0.1)	mg/L	<0.1	0.23	< 0.5 mg/L	DO (<0.1)	0.24	< 0.5 mg/L
Temperature	°C		25.05			25.16	°C
Baro. Press.	mmHg		766.1			762.9	mmHg

TURBIDITY METER

METER TYPE: Hach
MODEL NO.: 2100Q
UNIT ID NO.: M024-36

	Units	Standard Value	Meter Value	Standard Value	Meter Value	*Acceptance Criteria (PM)
Standard	NTU	10	9.76	10	9.84	+/- 0.3 NTU of stan.
Standard	NTU	20	20.0	20	20.3	+/- 5% of standard
Standard	NTU	100	99.9	100	102	+/- 5% of standard
Standard	NTU	800	782	800	784	+/- 5% of standard

PHOTOIONIZATION DETECTOR

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Background	ppmv	<0.1		<0.1		within 5 ppmv of BG
Span Gas	ppmv	100		100		+/- 10% of standard

O_2-LEL 4 GAS METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

Methane	%	50		50		+/- 10% of standard
O_2	%	20.9		20.9		+/- 10% of standard
H_2S	ppmv	25		25		+/- 10% of standard
CO	ppmv	50		50		+/- 10% of standard

OTHER METER

METER TYPE:
MODEL NO.:
UNIT ID NO.:

See Notes Below for Additional Information

[X] Equipment calibrated within the Acceptance Criteria specified for each of the parameters listed above.

[ ] Equipment (not) calibrated within the Acceptance Criteria specified for each of the parameters listed above**.

MATERIALS RECORD

Deionized Water Source: Portland - FOS
Lot#/Date Produced:
Trip Blank Source: Lab
Sample Preservatives Source: Lab
Disposable Filter Type: 0.45µm
Calibration Fluids / Standard Source:
- DO Calibration Fluid (<0.1 mg/L) ---
- Other ---
- Other ---
- Other ---

	Cal. Standard Lot Number	Exp. Date
pH (4)	8GC347	3/20
pH (7)	8GC117	3/20
pH (10)	---	---
ORP	2340	12/22
Conductivity	8GK308	11/19
10 Turb. Stan.	A8232	11/19
20 Turb. Stan.	A8239	12/19
100 Turb. Stan.	A8236	11/19
800 Turb. Stan.	A8236	11/19
PID Span Gas	---	---
O_2-LEL Span Gas	---	---
DO	9GA674	1/20

NOTES:

wood.

* = Unless otherwise noted, calibration procedures and acceptance criteria are in general accordance with USEPA Region 1 SOPs for Field Instrument Calibration (EQASOP-Field Calibration) and Low Stress Purging and Sampling (EQASOP-GW001), each dated 1/19/2010. Additional acceptance criteria obtained from instrument specific manufacturer recommendations.

** = If meter reading is not within acceptance criteria, clean/replace probe and re-calibrate, or use calibrated back-up meter if available. If project requirements necessitate use of the instrument, clearly document any deviations from acceptance criteria on all data sheets and log book entries.

1 = DO Saturated standard value is calculated based on Oxygen Solubility at Indicated Pressure Chart from the USEPA Region 1 SOP for Field Instrument Calibration (EQASOP-Field Calibration), dated 1/19/2010.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-25	ROUND NO.	1
SAMPLE ID	OC-GW-25	SITE TYPE	Superfund	DATE	4/4/2019
TIME	START 11:05 END 11:51	JOB NUMBER	6107190016	BOTTLE TIME	11:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 4.90 FT.

WELL DEPTH (TOR): ~ 12.40 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 5.10 FT.

SCREEN LENGTH: N/A FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.02 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.24 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

0.02

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:08	5.10	136	Connect YSI						~ 11 ft.	
11:15	5.10	136	8.03	1210	6.85	4.35	3.60	-0.2		
11:30	5.10	136	8.47	1204	7.09	2.04	2.72	-66.9		
11:35	5.10	136	8.65	1196	7.11	1.94	2.66	-76.4		
11:40	5.10	136	8.64	1193	7.10	1.88	2.42	-73.0		
11:45	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 125 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 125 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 125 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 250 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.2 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: SAM

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-78S	ROUND NO.	1
SAMPLE ID	OC-GW-78S	SITE TYPE	Superfund	DATE	4/3/2019
TIME	START 12:51 END 14:41	JOB NUMBER	6107190016	BOTTLE TIME	14:35

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 4.05 FT.

WELL DEPTH (TOR): 10.54 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.24 FT.

SCREEN LENGTH: 9 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.03 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.22 GAL.

<0.01

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
12:58	4.24	164	Connect YSI						~ 8 ft.	
13:05	4.24	164	8.29	1281	6.84	2.06	92.4	97.1		
13:25	4.24	164	8.02	1275	6.76	3.24	55.1	86.6		
13:45	4.24	164	8.59	1274	6.75	2.81	25.7	87.8		
14:05	4.24	164	9.11	1273	6.74	1.97	11.4	95.9		
14:10	4.24	164	9.36	1274	6.74	1.68	9.90	97.6		
14:20	4.24	164	9.44	1273	6.74	1.42	6.11	100.6		
14:25	4.24	164	9.27	1275	6.74	1.35	5.98	101.2		
14:30	4.24	164	9.36	1272	6.74	1.24	5.63	101.5		
14:35	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP: [ ] QED BLADDER; [ ] SIMCO BLADDER; [X] GEOPUMP

TYPE OF TUBING: [ ] TEFLON OR TEFLON LINED; [X] HIGH DENSITY POLYETHYLENE; [ ] LDPE (Dedicated)

TYPE OF PUMP MATERIAL: [ ] POLYVINYL CHLORIDE; [ ] STAINLESS STEEL; [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL: [ ] TEFLON; [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 4.2 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: SAM

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-79S	ROUND NO.	1
SAMPLE ID	OC-GW-79S	SITE TYPE	Superfund	DATE	4/4/2019
TIME	START 7:41 END 8:41	JOB NUMBER	6107190016	BOTTLE TIME	8:35

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.18 FT.

WELL DEPTH (TOR): 11.38 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.22 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.45 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
7:45	3.22	192	Connect YSI						~ 10 ft.	
7:50	3.22	192	5.80	2157	6.40	8.84	16.4	92.6		
8:00	3.22	192	5.15	2142	6.40	5.92	11.9	55.9		
8:10	3.22	192	5.00	2139	6.39	7.40	10.8	43.2		
8:20	3.22	192	5.03	2135	6.38	6.79	8.41	41.4		
8:25	3.22	192	5.03	2136	6.40	6.20	7.84	41.5		
8:30	3.22	192	5.05	2138	6.38	5.67	7.26	44.0		
8:35	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 2.5 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: SAM

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-202S	ROUND NO.	1
SAMPLE ID	OC-GW-202S	SITE TYPE	Superfund	DATE	4/3/2019
TIME	START 7:10 END 8:05	JOB NUMBER	6107190016	BOTTLE TIME	8:00

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.00 FT.

WELL DEPTH (TOR): 13.29 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.05 FT.

SCREEN LENGTH: 8 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.92 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
7:18	Start Pump								~ 10 ft.	
7:30	6.02	200	7.55	959	6.01	2.13	16.3	76.0		
7:35	6.05	200	7.60	958	6.03	0.86	14.2	74.5		
7:40	6.05	200	7.68	957	6.06	0.74	10.6	74.2		
7:45	6.05	200	7.88	956	6.08	0.66	4.95	71.7		
7:50	6.05	200	7.95	959	6.10	0.67	3.82	70.3		
7:55	6.05	200	7.99	962	6.13	0.70	3.91	68.2		
8:00	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.9 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: JJL

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-202D	ROUND NO.	1
SAMPLE ID	OC-GW-202D	SITE TYPE	Superfund	DATE	4/3/2019
TIME	START 8:10 END 9:10	JOB NUMBER	6107190016	BOTTLE TIME	9:00

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 5.41 FT.

WELL DEPTH (TOR): 22.68 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 5.45 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.24 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:12	Start Pump								~ 20 ft.	very turbid
8:15	5.43	200	8.55	2366	5.10	1.65	>1000	89.6		
8:20	5.45	200	8.48	2367	5.02	1.34	343	83.8		
8:25	5.45	200	8.47	2377	5.00	1.43	117	79.6		
8:30	5.45	200	8.51	2409	5.01	1.12	60.9	77.2		
8:35	5.45	200	8.66	2424	5.02	1.27	63.8	75.3		
8:40	5.45	200	8.68	2435	5.02	1.13	66.9	73.9		
8:45	5.45	200	8.72	2442	5.02	0.99	72.1	72.4		
8:50	5.45	200	8.83	2439	5.03	0.95	71.3	71.0		
8:55	5.45	200	8.90	2439	5.04	0.92	75.4	69.8		
9:00	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED ~ 2.2 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: JJL

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-16RRR	ROUND NO.	1
SAMPLE ID	OC-PZ-16RRR	SITE TYPE	Superfund	DATE	4/4/2019
TIME	START 8:47 END 9:39	JOB NUMBER	6107190016	BOTTLE TIME	9:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [ ] TOP OF WELL RISER
- [X] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.44 FT.

WELL DEPTH (TOR): 6.2 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.0 IN.

FINAL DEPTH TO WATER: 3.79 FT.

SCREEN LENGTH: 2 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP		X	
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: 0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.09 GAL.

0.01

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:49	3.79	110	Connect YSI						~ 6 ft.	
8:55	3.79	110	5.34	1881	6.66	3.83	18.8	32.2		
9:05	3.79	110	5.57	1976	6.63	2.33	10.7	21.9		
9:15	3.79	110	5.62	1941	6.62	2.79	4.91	21.9		
9:20	3.79	110	5.69	1891	6.61	2.90	3.75	21.7		
9:25	3.79	110	5.72	1861	6.60	2.97	2.47	20.8		
9:30	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [X] HIGH DENSITY POLYETHYLENE
- [ ] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [X] YES [ ] NO

NUMBER OF GALLONS GENERATED: ~ 1.1 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: SAM

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-17RRR	ROUND NO.	1
SAMPLE ID	OC-PZ17RRR	SITE TYPE	Superfund	DATE	4/3/2019
TIME	START 14:45 END 15:30	JOB NUMBER	6107190016	BOTTLE TIME	15:19

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [ ] TOP OF WELL RISER [X] TOP OF PROTECTIVE CASING [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 1.94 FT.

WELL DEPTH (TOR): 6.20 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.0 IN.

FINAL DEPTH TO WATER: Dry FT.

SCREEN LENGTH: 1 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP		X	
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: N/A GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: N/A

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.2 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
15:03	4.26	100	14.10	1262	7.02	6.65	21.7	-3.7	~ 6.0 ft.	
	Well Dry	Sample Recharge								
15:19	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 0.2 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

Well went dry; sample recharge

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: SAM

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-18R	ROUND NO.	1
SAMPLE ID	OC-PZ-18R	SITE TYPE	Superfund	DATE	4/3/2019
TIME	START 9:10 END 10:25	JOB NUMBER	6107190016	BOTTLE TIME	10:00

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [ ] TOP OF WELL RISER [X] TOP OF PROTECTIVE CASING [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 1.78 FT.

WELL DEPTH (TOR): ~ 5.99 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.25 IN.

FINAL DEPTH TO WATER: 2.64 FT.

SCREEN LENGTH: 1.6 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED		X	
COLLAR		X	

DRAWDOWN VOLUME: 0.078 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.54 GAL.

0.05

(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:18	Start Pump								~ 5.0 ft.	
9:30	2.64	160	6.27	4966	6.10	3.06	10.7	52.0		
9:35	2.64	160	6.02	4937	6.30	1.04	6.99	37.0		
9:40	2.64	160	6.19	4885	6.35	1.15	6.01	34.1		
9:45	2.64	160	6.25	4840	6.35	1.06	6.41	36.0		
9:50	2.64	160	6.31	4797	6.35	0.99	6.27	37.3		
9:55	2.64	160	6.35	4767	6.35	0.97	6.63	38.3		
10:00	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.5 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: JJL

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-24	ROUND NO.	1
SAMPLE ID	OC-PZ-24	SITE TYPE	Superfund	DATE	4/3/2019
TIME	START 7:50 END 10:02	JOB NUMBER	6107190016	BOTTLE TIME	9:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 8.12 FT.

WELL DEPTH (TOR): 17.86 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 8.22 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.62 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

<0.01

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:04	8.22	148	Connect YSI						~ 14 ft.	
8:10	8.22	148	6.71	1892	6.18	2.59	63.6	153.4		
8:30	8.22	148	6.81	1801	6.37	7.92	29.5	-1.7		
8:40	8.22	148	6.90	1805	6.42	7.39	22.7	-9.4		
9:00	8.22	148	6.94	1804	6.48	4.49	12.6	-10.7		
9:10	8.22	148	6.79	1809	6.52	3.67	10.7	-8.0		
9:20	8.22	148	6.96	1808	6.56	3.05	8.58	-7.6		
9:30	8.22	148	7.08	1811	6.53	2.66	7.76	-6.2		
9:40	8.22	148	7.27	1810	6.60	2.38	3.87	-4.9		
9:45	8.22	148	7.37	1808	6.64	2.22	3.99	-5.2		
9:50	8.22	148	7.34	1814	6.61	2.07	3.45	-5.2		
9:55	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: ~ 4.6 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: SAM

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	PZ-25	ROUND NO.	1
SAMPLE ID	OC-PZ-25	SITE TYPE	Superfund	DATE	4/3/2019
TIME	START 10:06 END 11:55	JOB NUMBER	6107190016	BOTTLE TIME	11:50

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 7.89 FT.

WELL DEPTH (TOR): 16.52 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 7.89 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: <0.01 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: <0.01

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.02 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:20	7.90	156	Connect YSI						~ 13 ft.	
10:25	7.90	156	7.51	1360	6.43	1.94	92.2	53.9		
10:45	7.90	156	7.78	1336	6.40	1.83	36.6	61.9		
11:05	7.90	156	8.12	1326	6.38	1.65	14.3	63.1		
11:15	7.90	156	8.10	1328	6.38	1.66	11.5	63.7		
11:25	7.90	156	8.35	1325	6.39	1.54	9.19	64.1		
11:35	7.90	156	8.44	1325	6.36	1.46	4.91	64.7		
11:40	7.90	156	8.41	1325	6.35	1.50	4.40	64.5		
11:45	7.90	156	8.49	1322	6.36	1.52	3.51	65.2		
11:50	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 4.0 gal.

NOTES Chloride and Sulfate analysis collected in one 500mL bottle

SIGNATURE: Field Form w/ Signature on File

LOCATION SKETCH

Sampled by: SAM

Prepared by: SAM

Checked by: CTM

wood.

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	WELL ID	GW-16R	ROUND NO.	1
SAMPLE ID	OC-GW-16R	SITE TYPE	Superfund	DATE	4/3/2019
TIME	START 8:00 END 9:25	JOB NUMBER	6107190016	BOTTLE TIME	8:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT: [X] TOP OF WELL RISER; [ ] TOP OF PROTECTIVE CASING; [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 10.47 FT.

WELL DEPTH (TOR): ~ 17.2 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 10.82 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.056 GAL.
(final - initial x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.46 GAL.

0.04
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/min) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)(>0.5)	TURBIDITY (NTU) (10%) (> 5)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:05	Start Pump								~ 15 ft.	
8:10	10.79	125	7.91	194	6.11	1.73	33.7	10.1		
8:15	10.81	125	7.93	193	6.12	1.59	10.5	11.1		
8:20	10.82	125	7.60	190	6.17	1.31	9.64	14.9		
8:25	10.80	125	7.51	186	6.24	0.93	11.4	18.5		
8:30	10.81	125	7.55	185	6.27	0.75	9.76	19.4		
8:35	10.80	125	7.47	184	6.30	0.69	9.94	20.2		
8:40	10.82	125	7.78	184	6.35	0.73	9.53	18.7		
8:45	10.82	125	7.67	184	6.38	0.67	9.50	18.8		
8:50	10.82	125	7.71	184	6.39	0.72	9.47	18.6		
8:55	Collect Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[X] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[ ] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: ~ 1.5 gal.

NOTES

LOCATION SKETCH

Sampled by: CHL

Prepared by: SAM

Checked by: CTM

SIGNATURE: Field Form w/ Signature on File

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 4/2/2019

FIELD SAMPLE ID: OC-SW-ISCO2 | ACTIVITY TIME: START 13:05 END 13:15 | BOTTLE TIME: 13:10

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.50 ft.	SPEC. COND	887 µS/cm
DEPTH OF SAMPLE FROM SURFACE	0.25 ft.	D.O.	12.40 mg/L
TEMPERATURE	9.07 DEG C	SALINITY	--- %
TURBIDITY	4.45 NTU	ORP	144.7 mV
pH	6.24 UNITS		

EQUIPMENT USED

- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER

- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER South Ditch

DECON FLUIDS USED:

- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: Location prior to discharge into the East Ditch

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT

- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER _____

EQUIPMENT FOR COLLECTION

- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED

- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: CTM
Prepared by: SAM
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 4/2/2019

FIELD SAMPLE ID: OC-SW-ISCO3 | ACTIVITY TIME: START 12:52 END 13:05 | BOTTLE TIME: 13:00

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.60 ft.	SPEC. COND	1,054 µS/cm
DEPTH OF SAMPLE FROM SURFACE	0.30 ft.	D.O.	11.50 mg/L
TEMPERATURE	14.34 DEG C	SALINITY	--- %
TURBIDITY	2.75 NTU	ORP	107.6 mV
pH	6.82 UNITS		

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER East Ditch

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: East Ditch; Up-stream of South Ditch confluence; Along Railway

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER _____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: CTM
Prepared by: SAM
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 4/2/2019

FIELD SAMPLE ID: OC-SW-PZ16RRR | ACTIVITY TIME: START 13:25 END 13:35 | BOTTLE TIME: 13:30

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.40 ft.	SPEC. COND	1,020 µS/cm
DEPTH OF SAMPLE FROM SURFACE	0.20 ft.	D.O.	10.57 mg/L
TEMPERATURE	10.41 DEG C	SALINITY	--- %
TURBIDITY	3.84 NTU	ORP	180.5 mV
pH	6.07 UNITS		

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER South Ditch

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: At location PZ-16RRR

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ] | SAMPLE OBSERVATIONS | ODOR _____ | COLOR _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: CTM
Prepared by: SAM
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 4/2/2019

FIELD SAMPLE ID: OC-SW-PZ17RRR | ACTIVITY TIME: START 13:35 END 13:45 | BOTTLE TIME: 13:40

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.50 ft.	SPEC. COND	1,041 µS/cm
DEPTH OF SAMPLE FROM SURFACE	0.25 ft.	D.O.	11.13 mg/L
TEMPERATURE	9.85 DEG C	SALINITY	--- %
TURBIDITY	2.08 NTU	ORP	182.8 mV
pH	5.95 UNITS		

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER South Ditch

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: At location PZ-17RRR

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: CTM
Prepared by: SAM
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 4/2/2019

FIELD SAMPLE ID: OC-SW-PZ18R | ACTIVITY TIME: START 14:00 END 14:08 | BOTTLE TIME: 14:05

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.60 ft.	SPEC. COND	2,254 µS/cm
DEPTH OF SAMPLE FROM SURFACE	0.30 ft.	D.O.	11.21 mg/L
TEMPERATURE	9.10 DEG C	SALINITY	--- %
TURBIDITY	1.87 NTU	ORP	148.1 mV
pH	5.94 UNITS		

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [X] OTHER: Weir Area

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

Notes: At location PZ-18R

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ]

TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: CTM
Prepared by: SAM
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE: 4/2/2019

FIELD SAMPLE ID: OC-SW-SD17 | ACTIVITY TIME: START 13:50 END 14:00 | BOTTLE TIME: 13:55

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.30 ft.	SPEC. COND	1,044 µS/cm
DEPTH OF SAMPLE FROM SURFACE	0.20 ft.	D.O.	8.83 mg/L
TEMPERATURE	10.13 DEG C	SALINITY	--- %
TURBIDITY	1.99 NTU	ORP	179.7 mV
pH	5.90 UNITS		

EQUIPMENT USED: [ ] BEAKER; [ ] PACS BOMB; [X] PERISTALTIC PUMP; [X] FILTER (0.45 micron); [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER: [X] STREAM/ DITCH; [ ] LAKE/ POND; [ ] SEEP; [ ] MARSH; [X] OTHER South Ditch

DECON FLUIDS USED: [ ] DI WATER; [ ] POTABLE WATER; [ ] NONE

Notes: Up-stream of location PZ-17RRR

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH [ ] | END DEPTH [ ] | TYPE OF SAMPLE: GRAB [ ]

SAMPLE OBSERVATIONS: ODOR _____ COLOR _____

TYPE OF SEDIMENT: [ ] ORGANIC; [ ] SAND; [ ] GRAVEL; [ ] CLAY; [ ] OTHER_____

EQUIPMENT FOR COLLECTION: [ ] HAND AUGER; [ ] S.S. SPOON; [ ] ALUMINIUM PAN; [ ] DREDGE; [ ] OTHER _____

DECON FLUIDS USED: [ ] DI WATER; [ ] POTABLE WATER; [ ] LIQUINOX; [ ] OTHER _____

FLOC OBSERVED _____ CLEAR OF LEAF LITTER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Field Form w/ Signature on File

Sampled by: CTM
Prepared by: SAM
Checked by: CTM

WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107190016 | DATE:

FIELD SAMPLE ID: | ACTIVITY TIME: START END | BOTTLE TIME:

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION: ft. | SPEC. COND: µS/cm

DEPTH OF SAMPLE FROM SURFACE: ft. | D.O.: mg/L

TEMPERATURE: DEG C | SALINITY: --- %

TURBIDITY: NTU | ORP: mV

pH: UNITS

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ DITCH
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] NONE

SEDIMENT DATA

SEDIMENT SAMPLE: START DEPTH | END DEPTH

TYPE OF SAMPLE: GRAB

SAMPLE OBSERVATIONS

ODOR _____

COLOR _____

FLOC OBSERVED _____ | CLEAR OF LEAF LITTER _____

TYPE OF SEDIMENT
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER_____

EQUIPMENT FOR COLLECTION
- [ ] HAND AUGER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: _____

Sampled by:
Prepared by:
Checked by:

Appendix B

Chain of Custody Records

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

360325-Boston 360325-Boston 360325-Boston

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Chris Mazzolini	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-128049-28918.1
Client Contact: Mr. Brian Guichard	Phone: 339 927 3796	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Olin Corporation				Job #:
Address: 51 Eames street	Due Date Requested:			
City: Wilmington	TAT Requested (days): Standard			
State, Zip: MA, 01887				
Phone: 423-336-4012(Tel)	PO #: REWI0025			
Email: beguichard@olin.com	WO #:			
Project Name: Quarterly GW Q1-2019	Project #: 48019903			
Site: Olin - Wilmington, MA	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL M - Hexane
B - NaOH N - None
C - Zn Acetate O - AsNaO2

480-151331 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D - Chloride & Sulfate	350.1 - Nitrogen, Ammonia	6010MCP - Diss. Al, Cr (Field Filtered)	2510B - Specific Conductance	Total Number of co	Special Instructions/Note:
Preservation Code:					X	X	N	S	D	N	X	
OC-GW-202S	4/3/19	0800	G	Water	Y	N	1	1	1	1	4	
OC-GW-202D	4/3/19	0900	G	Water								
~~OC-GW-25~~				~~Water~~								CTM
OC-GW-78S	4/3/19	1435	G	Water								
~~OC-GW-79S~~				~~Water~~								CTM
~~OC-PZ-16RRR~~				~~Water~~								CTM
OC-PZ-17RRR	4/3/19	1519	G	Water								
OC-PZ-18R	4/3/19	1000	G	Water								
OC-PZ-24	4/3/19	0955	G	Water								
OC-PZ-25	4/3/19	1150	G	Water								
				Water								4/3/19

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		4/3/19 1545	Wood		4-3-19 1545	
2		4/3/19 1800			04/04/19 0100	
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 3.1 #1

Ver: 01/16/2019

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

360325-Boston 360325-Boston 360325-Boston

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: JAM MIZUSAWA	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-128049-28918.1
Client Contact: Mr. Brian Guichard	Phone: 978-427-5682	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Olin Corporation				Job #:

Address: 51 Eames street	Due Date Requested: STANDARD
City: Wilmington	TAT Requested (days): STANDARD
State, Zip: MA, 01887	
Phone: 423-336-4012(Tel)	PO #: REWI0025
Email: beguichard@olin.com	WO #:
Project Name: Quarterly GW	Project #: 48019903
Site: OLIN WILMINGTON	SSOW#:

Analysis Requested

Preservation Codes:
A - HCl
L - EDA
Z - other (specify)
Other:

480-151401 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No) (VOID ONLY)	Perform MS/MSD (Yes or No)	300.0_28D - Chloride & Sulfate	350.1 - Nitrogen, Ammonia	6010MCP - Diss. Al, Cr	2510B - Specific Conductance	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	S	D	N		
~~OC-GW-202S~~				Water								
~~OC-GW-202D~~				Water								
OC-GW-25	4/4/19	1145	G	Water	Y		X	X	X	X	4	
~~OC-GW-78S~~				Water								
OC-GW-79S	4/4/19	0835	G	Water	Y		X	X	X	X	4	
OC-PZ-16RRR	4/4/19	0930	G	Water	Y		X	X	X	X	4	
~~OC-PZ-17RRR~~				Water								
~~OC-PZ-18R~~				Water								
~~OC-PZ-24~~				Water								
~~OC-PZ-25~~				Water								
				Water								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 4/4/19 1510	Company: Ward	Received by:	Date/Time: 4-4-19 1510	Company: TA
Relinquished by:	Date/Time: 4-4-19 1605	Company: D	Received by:	Date/Time: 04/05/19 900	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.2 #1

Ver: 01/16/2019

360325 Boston 360325 Boston 360325 Boston

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Chris Mazzolini	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-128055-28920.1
Client Contact: Mr. Brian Guichard	Phone: 339 927 3796	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Olin Corporation				Job #:

Address: 51 Eames street	Due Date Requested:	Analysis Requested	Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, M - Hexane, N - None, O - AsNaO2, P - Na2O4S
City: Wilmington	TAT Requested (days): Standard		
State, Zip: MA, 01887			
Phone: 423-336-4012(Tel)	PO #: REWI0025		
Email: beguichard@olin.com	WO #:		
Project Name: Plant B Quarterly Q1 - 2019	Project #: 48019903		
Site: Olin Wilmington, MA	SSOW#:		Other:

480-151332 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	350.1 - Nitrogen, Ammonia	6010MCP - Fe	MAVPH - MA VPH	8260MCP - 8260 TMPs only	8270_LL_MCP - 8270 NDPA and BEHP only	9040C - pH	Total Number of co	Special Instructions/Note:
			Preservation Code:				S	D	A	A	N	N		
OC-GW-16R	4/3/19	0855	G	Water	Y	N	1	1	3	3	2	1	11	
				Water										

4/3/19

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 4/3/19 1545	Company: Wood	Received by:	Date/Time: 4-3-19 1545	Company: FP
Relinquished by:	Date/Time: 4-3-19 1800	Company: FP	Received by:	Date/Time: 04/04/19 0900	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: @ 3.1 #1

Ver: 01/16/2019

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

360325-Boston 360325-Boston 360325-Boston

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: CHRIS MAZZOLINI	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 480-128053-28919.1
Client Contact: Mr. Brian Guichard	Phone: 339-927-3796	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Olin Corporation				Job #:

Address: 51 Eames street	Due Date Requested:	Analysis Requested
City: Wilmington	TAT Requested (days): STANDARD	
State, Zip: MA, 01887		
Phone: 423-336-4012(Tel)	PO #: REWI0025	
Email: beguichard@olin.com	WO #:	
Project Name: SW Quarterly 1st 2019	Project #: 48019903	
Site: OLIN WILMINGTON	SSOW#:	

480-151200 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No) (Log-10 MCP ONLY)	Perform MS/MSD (Yes or No)	300.0_28D - Sulfate and Chloride	350.1 - Nitrogen, Ammonia	6010MCP - Diss. Al, Cr, Na	2510B, 353.2, 353.2_Nitrite, Nitrate_Calc	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	S	D	N		
OC-ISCO1	4/2/19	1410	G	Water	Y		1	1	1	2	5	
OC-ISCO2	4/2/19	1310	G	Water	Y		1	1	1	2	5	
OC-ISCO3	4/2/19	1300	G	Water	Y		1	1	1	2	5	
OC-PZ-16RRRSW	4/2/19	1330	G	Water	Y		1	1	1	2	5	
OC-PZ-17RRRSW	4/2/19	1340	G	Water	Y		1	1	1	2	5	
OC-SD-18RSW	4/2/19	1405	G	Water	Y		1	1	1	2	5	
OC-SD-17	4/2/19	1355	G	Water	Y		1	1	1	2	5	
				Water								
									4/2/19			

n Codes:
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)
Other:
I - Ice
J - DI Water
K - EDTA
L - EDA

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 4/2/19 1510	Company Wood	Received by:	Date/Time: 4-2-19 1510	Company TA
Relinquished by:	Date/Time: 4-2-19 1540	Company TA	Received by:	Date/Time: 04/03/19 0100	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 2.8 #1

Ver: 01/16/2019

Appendix C

Cap Inspection Log

Olin Wilmington Containment Area Temporary Cap Inspection			
Date:	3 / 29 / 2019	**Inspector:**	Brian Guichard

Inspection Checklist

Feature	Observations		Notes
Drain	☑ Clear and Functioning	☐ Requires Maintenance	Date Cleared:
Sewn Seams	☐ Intact	☑ Requires Repairs	Date Repaired:
Ballast	☐ Intact	☑ Requires Replacement	Date Replaced:
Panels	X	Repair Locations	Date:
Ballast Locations	O	Locations Replaced or Repaired	XXX WIND DAMAGE AREAS
Seam Locations	—	Locations Repaired	SEAM REPAIR/TEAR

Note: Repairs done earlier in the season do not seem to be adhering to the cap surface sufficiently. Patches completed on the older sections of the cap do not stick because of the thread bare areas around the patch, and a few of the patches on the newer section of the cap do not seem to adhere to the newer cap material because it is thin and flimsy and not a smooth surface to bond to. Large sections in several areas of the cap have sustained damage from severe winter winds. Attempts will be made to pull back and re-ballast those sections where possible.

Appendix B

Data Validation Memoranda
(*Provided on CD*)

Appendix B1-B2

Fourth Quarter 2018 Sampling Event
First Quarter 2019 Sampling Event

Appendix B3

Additional Sampling Events
November 2018 Calcium Sulfate Landfill Sampling
December 2018 Private Well Sampling
March and April 2019 Private Well Sampling

Appendix B4

Unvalidated Data
October 2018 – March 2019
Plant B RGP and Tank Sampling

Appendix C

Weir Monthly Inspection Reports: October 2018 – March 2019

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
USA
T: 978-692-9090
www.woodplc.com

October 26, 2018

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – October 2018
Wood Project No. 6107-18-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of October 2018 are attached. Wood conducted an inspection on Friday, October 26, 2018.

West Ditch Off-Property

Stations A and B had a low level to normal level of clear water during all four inspections of the month. No flow and floating/ submerged leaves were observed during the fourth and final inspection of the month.

Weir

Station D had a low level of clear water during the second and third inspections of the month. During the first and fourth inspection, Station D had a normal level and flow of clear water with floating and submerged leaves and a rust-orange color stream bottom (fourth inspection only).

There was a trickle flow to no flow from the Weir outlet and a no flow from the Plant B outlet during the first three inspections of the month. There was no flow from either outlet during the fourth inspection of the month. The main area was mostly clear with had a trickle flow to low flow of clear water during all four inspections.

South Ditch Downstream of the Weir

Stations E and F had a trickle flow of clear water during the first three inspections of the month. There was a low level and flow of clear water with floating and submerged leaves and a brown-rust stream bottom during the fourth and final inspection of the month. Station G had a trickle flow to very low flow of clear water during all four inspections of the month.

The hay bale line had a trickle flow to low level and flow of clear water during all four inspections of the month. A brown stream bottom was noted during the fourth inspection of the month.

Wetland Areas South of the South Ditch

Stations H and I had some standing water and saturated soils during all four inspections of the month.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Principal Scientist

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
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Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 10/4/2018 **Time** 9:30 **Inspectors** Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				Stn H has some stading water.
	Station H		x	Stn I has some standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is mostly clear. The stream has a trickle flow of clear water.

The walking trail is muddy and has multiple animal trails throughout.

The Hay Bale line has a trickle flow.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 10/12/2018 **Time** 11:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				Stn H has saturated soil.
	Station H		x	Stn I has saturated soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and no flow from the outlet pipe. The main area is mostly clear. The stream has a trickle flow of clear water. The walking trail is less muddy.

The Hay Bale line has a trickle flow.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 10/19/2018 **Time** 10:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				Stn H has some standing water.
	Station H		x	Stn I has saturated soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and no flow from the outlet pipe. The main area is mostly clear. The stream has a trickle flow of clear water. The walking trail is less muddy. Vegetation is dying off for the winter season.

The Hay Bale line has a trickle flow.

Moved some fallen branches from the stream around stations E & F.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 10/26/2018 **Time:** 8:30 **Inspectors:** Shawna Iacozzi

~45°F

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		X	A: Low level of clear water, no flow, floating and submerged leaves
	Station B		X	B: Normal level of clear water, no flow, floating and submerged leaves
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D		X	D: Normal level of clear water w/ floating and submerged leaves and a rust orange bottom
Weir - Downstream				
	Station E		X	E & F: Low level and flow of clear water w/ a brown-rust bottom
	Station F		X	
	Station G		X	G: Very low flow of clear water
Unnamed Ditch				
	Station H		X	H: Saturated soil, some standing water
	Station I		X	I: Standing water with saturated soil
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was no flow from the Weir Outlet or from the Plant B Outlet.

The Main Area: Low level and flow of clear water, a brown-rust color was observed on the bottom.

The Hay Bale Line: Low level and flow of clear water w/ a brown bottom.

Leaves are falling and the vegetation is dying off due to colder temperatures.

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
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T: 978-692-9090
www.woodplc.com

November 30, 2018

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – November 2018
Wood Project No. 6107-18-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of November 2018 are attached. Wood conducted an inspection on Friday, November 30, 2018.

West Ditch Off-Property

Stations A and B had a low to normal level of clear water for the first four inspections of the month and a medium level of clear water with submerged leaves during the fifth and final inspection of the month.

Weir

Station D had a normal to low level of clear water during the first four inspections of the month. For the fifth inspection, Station D had a medium level and flow of clear water with floating leaves and a brown stream bottom.

During the first four inspections of the month there was no flow from the weir and low flow from the Plant B outlet pipe. During the fifth and final inspection, there was moderate to low flow and level of clear water from the weir and Plant B outlets. The Main Area was mostly clear with low flow to a trickle flow of clear water during the first four inspections of the month. During the fifth inspection, the Main Area had a medium to low level and flow of clear to slightly tannic water; with floating and submerged leaves; and a brown stream bottom.

South Ditch Downstream of the Weir

Stations E and F had a low to trickle flow of clear water during the first four inspections of the month. During the fifth inspection, a medium to high level and flow of clear water with some foaming was observed along with submerged leaves and a brown stream bottom. Station G had a low flow to trickle flow of clear water during the first four inspections of the month. During the fifth and final inspection of the month, Station G had a medium level and flow of clear water with some foaming; and a brown stream bottom.

The hay bale line had a trickle flow of clear water during the first four inspections of the month. A low level and flow of clear water; a brown stream bottom; and some slight foaming was observed during the fifth and final inspection of the month.

Wetland Areas South of the South Ditch

Stations H and I were observed flooded with standing water during the first, third, fourth, and fifth inspections of the month. Stations H and I were observed as dry with saturated soils during the second inspection of the month.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Principal Scientist

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
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Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Inspection Report

Date 11/2/2018 **Time** 9:30 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a low of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a low flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and a low flow from the outlet pipe. The main area is mostly clear. The stream has a low flow of clear water. The walking trail is muddy. Vegetation is mostly dead for the winter season.

The Hay Bale line has a trickle flow.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 11/9/2018 **Time** 9:30 **Inspectors** Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a low level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a low level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				Stn H has saturated soil.
	Station H		x	Stn I has saturated soil.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and no flow from the outlet pipe. The main area is mostly clear. The stream has a trickle flow of clear water.

The Hay Bale line has a trickle flow.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 11/16/2018 **Time** 1:00 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a low of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a low flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and a low flow from the outlet pipe. The main area is mostly clear. The stream has a low flow of clear water.

The walking trail is muddy with coyote and deer prints in the mud.

Vegetation is mostly dead for the winter season.

The Hay Bale line has a trickle flow.

Remove some fallen branches from the trail near the foot bridge.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 11/21/2018 **Time** 10:00 **Inspectors** Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a low of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a low flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is no flow from the weir and a low flow from the outlet pipe. The main area is mostly clear. The stream has a low flow of clear water.

The walking trail is frozen mud. Saw 3 deer near the foot bridge.

Vegetation is dead for the winter season.

The Hay Bale line has a trickle flow.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 11/30/2018 **Time:** 11:15 **Inspectors:** S. Iacozzi

~55°F; Partly cloudy

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A: Med level of clear water w/ submerged leaves
	Station B		**X**	B: Med level of clear water w/ submerged leaves
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D		**X**	D: Med. level and flow of clear water w/
				floating leaves and a brown color observed on the bottom
Weir - Downstream				
	Station E		**X**	E and F: Med. to high level and flow of clear water;
	Station F		**X**	w/ submerged leaves and a brown color on the bottom; foam observed
	Station G		**X**	G: Med. level and flow of clear water w/ brown stream bottom; foaming
				observed
Unnamed Ditch				
	Station H		**X**	H: Flooded
	Station I		**X**	I: Flooded
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a moderate level and flow of clear water from the Plant B outlet and a low level and flow from the Weir Outlet pipe.

The Main Area: Low to medium level and flow of clear to slightly tannic water; w/ a brown bottom w/ floating/submerged leaves observed.

The Hay Bale Line: Low level and flow of clear water; w/ a brown stream bottom and leaves observed; slight foaming noted.

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
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T: 978-692-9090
www.woodplc.com

December 27, 2018

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – December 2018
Wood Project No. 6107-18-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of December 2018 are attached. Wood conducted an inspection on Wednesday, December 27, 2018.

West Ditch Off-Property

During all four inspection Stations A and B had a high to normal level of clear water.

Weir

Station D had a high level to normal level of clear water during the first three inspections of the month. During the fourth and final inspection, Station D had medium level and low flow of clear water that was partially frozen; a brown stream bottom was also observed.

There was high flow to trickle flow from the Weir outlet; and moderate to low flow from the Plant B outlet during the first three inspections of the month. During the final inspection of the month, there was a moderate level and flow of clear water from the Weir and no flow from the Plant B outlet. The Main Area was mostly clear with a high to low flow of clear water during the first three inspections. For the fourth inspection, the area was partially frozen, with a low to medium flow of clear to tannic water.

South Ditch Downstream of the Weir

Stations E and F had a high to low flow of clear water, during the first three inspections of the month. During the fourth inspection, Stations E and F had a medium level and flow of clear water with submerged leaves noted and areas of foaming. Station G had a high to low flow of clear water during the first three inspections of the month. During the fourth inspection, Station G had a medium level and flow of clear water, with some foaming noted along with areas that were partially frozen.

The hay bale line had a high to low flow of clear water observed during the first three inspections. A low to medium level and flow of clear water, brown stream bottom, submerged leaves, and slight foaming were observed during the fourth and final inspection of the month.

Wetland Areas South of the South Ditch

Stations H and I had standing water for the first three inspections of the month. For the four and final inspection, Stations H and I were flooded and partially frozen.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Principal Scientist

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
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Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 12/7/2018 Time 9:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a high level of clear water.
	Station A		x	Stn B has a high level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a high level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a high flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a high flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a high flow from the weir and a moderate flow from the outlet pipe. The main area is mostly clear. The stream has a high flow of clear water. The walking trail is muddy.

The Hay Bale line has a high flow of clear water.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 12/14/2018 **Time** 9:00 **Inspectors** Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a medium flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a medium flow of clear water.
Unnamed Ditch				Stn H has standing water.
	Station H		x	Stn I has standing water.
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a low flow from the weir and a low flow from the outlet pipe. The main area is mostly clear. The stream has a medium flow of clear water. The walking trail is muddy.

The Hay Bale line has a medium flow of clear water.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 12/20/2018 Time 9:00 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a low flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a low flow of clear water.
Unnamed Ditch				
	Station H		x	Stn H has some standing water.
	Station I		x	Stn I has standing water.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and a low flow from the outlet pipe. The main area is mostly clear. The stream has a low flow of clear water. The walking trail is still muddy but a bit better than last week.

The Hay Bale line has a low flow of clear water.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 12/27/2018 **Time:** 8:15 **Inspectors:** S. Iacozzi

~30°F; Partly sunny

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A: Normal level of clear water w/ submerged leaves
	Station B		**X**	B: Normal level of clear water w/ submerged leaves
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D		**X**	D: Med. level and low flow of clear water that was partially frozen in areas
				with less flow; a brown color stream bottom was observed
Weir - Downstream				
	Station E		**X**	E and F: Med. level and flow of clear water; w/ submerged leaves and
	Station F		**X**	a brown color on the bottom; slight foaming observed
	Station G		**X**	G: Med level & flow of clear water w/ brown stream bottom; slight foaming
				observed; areas with less flow were partially frozen
Unnamed Ditch				
	Station H		**X**	H: Flooded and partially frozen
	Station I		**X**	I: Flooded and partially frozen
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a moderate level and flow of clear water from the Weir outlet and no flow from the Plant B Outlet pipe.

The Main Area: Low to medium level and flow of clear to slightly tannic water; w/ a brown bottom w/ submerged leaves observed.

Some parts of the main area were partially frozen.

The Hay Bale Line: Low to med. level and flow of clear water; w/ a brown stream bottom and leaves observed; slight foaming noted.

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
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USA
T: 978-692-9090
www.woodplc.com

January 24, 2019

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – January 2019
Wood Project No. 6107-19-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of January 2019 are attached. Wood conducted an inspection on Wednesday, January 24, 2019.

West Ditch Off-Property

Stations A and B had a normal level of clear water during the first three inspections of the month. For the fourth inspection, Stations A and B has a high level of clear water.

Weir

Station D had a normal level of clear water during the first three inspections of the month. During the fourth and final inspection, Station D had high level of clear water.

There was trickle flow from the Weir outlet; and no flow from the Plant B outlet during the first three inspections of the month. During the final inspection of the month, there was a moderate to high level and flow of clear water from the Weir and Plant B outlets. The Main Area was mostly clear with a trickle flow of clear water and partially ice covered during the first three inspections. For the fourth inspection, the area was mostly clear and had a high flow of clear water.

South Ditch Downstream of the Weir

Stations E and F had a trickle flow of clear water during the first three inspections of the month. During the fourth inspection, Stations E and F had a moderate to high flow of clear water. Station G had a trickle flow of clear water during the first three inspections of the month. During the fourth inspection, Station G had a moderate to high flow of clear water.

The hay bale line had a trickle flow of clear water during the first three inspections. A high flow of clear water was observed during the fourth and final inspection of the month.

Wetland Areas South of the South Ditch

Stations H and I had some standing water that froze into ice during the first three inspections of the month. For the four and final inspection, Stations H and I were snow covered.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Principal Scientist

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
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Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 1/4/2019 Time 9:00 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				
	Station H		x	Stn H has some standing water.
	Station I		x	Stn I has standing water.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is mostly clear. The stream has a trickle flow of clear water.

The Hay Bale line has a trickle flow of clear water.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Inspection Report

Date 1/11/2019 Time 8:00 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level of clear water.
	Station A		x	Stn B has a normal level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				
	Station H		x	Stn H has some frozen standing water.
	Station I		x	Stn I has some frozen standing water.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is mostly clear and partially ice covered. The stream has a trickle flow of clear water and has ice cover along the stream banks.

The Hay Bale line has a trickle flow of clear water.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 1/18/2019 Time 9:30 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level and partially ice covered.
	Station A		x	Stn B has a normal level and partially ice covered.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				
	Station H		x	Stn H has some ice.
	Station I		x	Stn I has some ice.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is mostly clear and partially ice covered. The stream has a trickle flow of clear water and has ice cover along the stream banks.

The Hay Bale line has a trickle flow of clear water.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 1/24/2019 **Time:** 11:30 **Inspectors:** Shawna Iacozzi

~45°F; Rain

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A: High level of clear water
	Station B		**X**	B: High level of clear water
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D		**X**	D: High level of clear water
Weir - Downstream				
	Station E		**X**	E: Moderate to high flow of clear water
	Station F		**X**	F: Moderate to high flow of clear water
	Station G		**X**	G: Moderate to high flow of clear water
Unnamed Ditch				
	Station H		**X**	H: Snow covered
	Station I		**X**	I: Snow covered
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a moderate to high level and flow of clear water from the Plant B Outlet and Weir Outlet pipe.

The Main Area: Mostly clear. The stream has a high flow of clear water, and the walking trail is snow covered.

The Hay Bale Line: High flow of clear water.

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
USA
T: 978-692-9090
www.woodplc.com

February 22, 2019

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – February 2019
Wood Project No. 6107-19-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of February 2019 are attached. Wood conducted an inspection on Friday, February 22, 2019.

West Ditch Off-Property

During all four of the inspections, Stations A and B had a low to normal levels of clear water and were partially covered by ice.

Weir

During all four of the inspections, Station D had a normal level of clear water. For the first and fourth inspection, some ice was noted. During the fourth and final inspection, submerged leaves and a brown-rust stream bottom were noted.

During the first three inspections, there was a trickle flow from the Weir outlet. During the first and second inspections, there was no flow from the Plant B outlet pipe. During the third inspection there was a trickle flow of clear water from the Plant B outlet. For the fourth and final inspection, there was a low level and flow of clear water from the Weir and Plant B outlets. During the first three inspections, the Main Area was mostly clear, partially ice covered with a trickle of clear water with ice along the stream banks. During the fourth inspection, the Main Area had a low to medium level and flow of clear water with submerged leaves; an orange-rust color was observed on the stream bottom; along with some floating ice.

South Ditch Downstream of the Weir

Stations E and F had a trickle flow of clear water during the first three inspections of the month. During the fourth inspection, Stations E and F had a medium level and flow of clear water with a brown stream bottom and ice noted along the banks. Station G had a trickle flow of clear water during the first three inspections of the month. During the fourth inspection of the month, Station G had a low level and flow of clear water with a brown stream bottom.

The hay bale line had a trickle flow of clear water during the first three inspections of the month. A low level and flow of clear water, a rust color stream bottom, and ice along the banks was observed during the fourth and final inspection of the month.

Wetland Areas South of the South Ditch

Stations H and I were iced over during the first three inspections of the month. During the fourth inspection, Stations H & I were snow covered.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Principal Scientist

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
[\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\South Ditch\Monthly Inspections\2019\02_2019\February 2019 Inspection.docx]

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Inspection Report

Date 2/1/2019 **Time** 10:30 **Inspectors** Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level and partially ice covered.
	Station A		x	Stn B has a normal level and partially ice covered.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				
	Station H		x	Stn H has some ice.
	Station I		x	Stn I has some ice.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is mostly clear and partially ice covered. The stream has a trickle flow of clear water and has ice cover along the stream banks.

The Hay Bale line has no flow.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Inspection Report

Date 2/8/2019 Time 8:30 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level and is ice covered.
	Station A		x	Stn B has a normal level and is ice covered.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level and ice covered.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				
	Station H		x	Stn H has ice.
	Station I		x	Stn I has ice.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is mostly ice covered. The stream has a trickle flow of clear water and has ice cover along the stream banks.

The Hay Bale line has a trickle flow.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 2/15/2019 **Time** 8:30 **Inspectors** Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level and partly ice covered.
	Station A		x	Stn B has a normal level and is partly ice covered.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a trickle flow of clear water.
Unnamed Ditch				
	Station H		x	Stn H has some ice.
	Station I		x	Stn I has some ice.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and a trickle flow from the outlet pipe. The main area is partly ice covered. The stream has a trickle flow of clear water and has ice cover along the stream banks.

The Hay Bale line has a trickle flow.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 2/22/2019 **Time:** 9:15 **Inspectors:** Shawna Iacozzi

~35°F; Sunny

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A: Normal level of clear water, partially frozen along banks
	Station B		**X**	B: Normal level of clear water, partially frozen along banks
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D		**X**	D: Med. level and flow of clear water w/ leaves and a brown-rust bottom;
				some ice noted
Weir - Downstream				
	Station E		**X**	E&F: Med. level & flow of clear water w/ and a brown stream bottom; partially
	Station F		**X**	frozen along the banks
	Station G		**X**	G: Low level and flow of clear water w/ brown stream bottom
Unnamed Ditch				
	Station H		**X**	H: Snow covered
	Station I		**X**	I: Snow covered
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a low level and flow of clear water from the Plant B Outlet and Weir Outlet pipe.

The Main Area: Low to med. level & flow of clear water w/ submerged leaves and an orange-rust color were observed on the bottom. Some floating ice.

The Hay Bale Line: Low level and flow of clear water w/ rust bottom, partially frozen along the banks.

The walking path was snow covered. Two white tail deer were seen near the foot bridge.

Wood Environment & Infrastructure Solutions, Inc.
271 Mill Road, 3rd Floor
Chelmsford, MA 01824
USA
T: 978-692-9090
www.woodplc.com

March 29, 2019

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – March 2019
Wood Project No. 6107-19-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by Wood Environment & Infrastructure Solutions, Inc. (Wood) and Olin Corporation. The weekly weir inspection reports for the month of March 2019 are attached. Wood conducted an inspection on Friday, March 29, 2019.

West Ditch Off-Property

Stations A and B had a normal level of clear water during the first inspection. During the second and third inspections, both Stations A and B were covered in snow. For the fourth and fifth inspections of the month, Stations A and B had a medium to high level and medium to low flow of clear water.

Weir

Station D had a normal level of clear water during the first inspection and was covered with snow during the second and third inspections of the month. A high level and medium flow of clear water was observed during the fourth and fifth inspections of the month.

There was a trickle flow from the Weir outlet and no flow from the Plant B outlet during the first three inspections. During the fourth and fifth inspection, there was a medium/ moderate level and flow of clear water from the Weir outlet and Plant B outlet. The Main Area was partially covered with ice during the first inspection and was snow covered for the second and third inspections of the month. During the fourth and fifth inspection, the Main Area had a high level and flow of clear water with some floating algae noted during the final inspection.

South Ditch Downstream of the Weir

Stations E and F had a trickle flow to moderate flow of clear water for the first four inspections of the month. For the fifth and final inspection, Stations E and F had a moderate level and flow of clear water with algae growth. Station G was covered with snow during the first three inspections of the month. Station G has a moderate level and medium flow of clear water during the fourth and fifth inspection of the month. Algae growth was observed during the fifth and final inspection of the month.

The hay bale line had a trickle flow of clear water during the first inspection of the month and was covered with snow during the second and third inspections of the month. A moderate level and flow of clear water and a rust color stream bottom was observed during the fourth and fifth inspection of the month.

Wetland Areas South of the South Ditch

Stations H and I were covered in snow and ice during the first three inspections of the month. During the fourth and fifth inspections, both Stations H and I were flooded and had saturated soils.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

Chris Mazzolini
Senior Project Scientist

Michael J. Murphy
Principal Scientist

Attachments

cc: Mr. James Cashwell, Olin Corp. (Electronic)
Mr. Chinny Esakkiperumal, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Garry Waldeck, MassDEP – Boston
Wood Project File
[\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\South Ditch\Monthly Inspections\2019\03_2019\March 2019 Inspection.docx]

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 3/1/2019 **Time** 11:30 **Inspectors** Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a normal level and partly ice/snow covered.
	Station A		x	Stn B has a normal level and is partly ice covered.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a normal level of clear water.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G is snow and ice covered.
Unnamed Ditch				
	Station H		x	Stn H has some snow/ice.
	Station I		x	Stn I has some snow/ice.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is partly ice covered. The stream has a trickle flow of clear water and has ice cover along the stream banks and snow on the walking trail.

The Hay Bale line has a trickle flow and is mostly snow and ice covered.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 3/8/2019 **Time** 8:30 **Inspectors** Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A is snow covered.
	Station A		x	Stn B is snow covered.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D snow and ice covered.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G is snow covered.
Unnamed Ditch				
	Station H		x	Stn H is snow covered.
	Station I		x	Stn I is snow covered.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is mostly snow and ice covered. The stream has a trickle flow of clear water and has snow and ice cover along the stream banks and snow on the walking trail.

The Hay Bale line is snow covered.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 3/15/2019 **Time** 10:00 **Inspectors** Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A is snow covered.
	Station A		x	Stn B is snow covered.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D snow and ice covered.
	Station D	x		
Weir - Downstream				Stations E & F have a trickle flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G is snow covered.
Unnamed Ditch				
	Station H		x	Stn H is snow covered.
	Station I		x	Stn I is snow covered.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a trickle flow from the weir and no flow from the outlet pipe. The main area is mostly snow and ice covered. The stream has a trickle flow of clear water and has snow and ice cover along the stream banks and snow on the walking trail.

The Hay Bale line is snow covered.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Inspection Report

Date 3/22/2019 **Time** 9:30 **Inspectors** Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has an elevated level of clear water.
	Station A		x	Stn B has an elevated level of clear water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stn D has a high level of clear water
	Station D	x		
Weir - Downstream				Stations E & F have a moderate flow of clear water.
	Station E	x		
	Station F	x		
	Station G	x		Stn G has a moderate flow of clear water.
Unnamed Ditch				
	Station H		x	Stn H is flooded.
	Station I		x	Stn I is flooded.
Supplemental Inspection Locations (designate station location on page 2 of				
Staff Gauge Level				

Condition of Weir / Hay bale Barriers: There is a medium flow from the weir and a medium flow from the outlet pipe. The main area is clear. The stream has a moderate flow of clear water. The walking trail is mostly mud from an ongoing rain event.

The Hay Bale line has a moderate flow of clear water.

Note: there is an ongoing rain event with moderate to heavy periods of rain fall.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 3/29/2019 **Time:** 11:00 **Inspectors:** Shawna Iacozzi

~50 ºF;light rain

Station		Precipitate Observation		Other Observations
		Yes	No	
Off-site Fenced Ditch System				
	Station A		**X**	A: High level of clear water
	Station B		**X**	B: High level of clear water
West Ditch Foot Bridge				
	Station C			C: Filled in
Weir - Upstream				
	Station D	**X**		D: Med/high level and flow of clear water w/ a brown-rust bottom
Weir - Downstream				
	Station E	**X**		E&F: Moderate level and flow of clear water, algae growth noted on water surface
	Station F	**X**		
	Station G	**X**		G: Moderate level and flow of clear water, algae growth noted on water surface
Unnamed Ditch				
	Station H		**X**	H: Saturated soil/mud
	Station I		**X**	I: Saturated soil/mud
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Hay Bale Barriers:

There was a moderate flow of clear water from Plant B outlet, and from the Weir Outlet.

The Main Area: The main area was clear with some algae growth noted. The stream had a moderate level & flow of clear water w/ algae noted growing on the surface of the water.

The Hay Bale Line: Moderate level and flow of clear water w/ rust bottom.

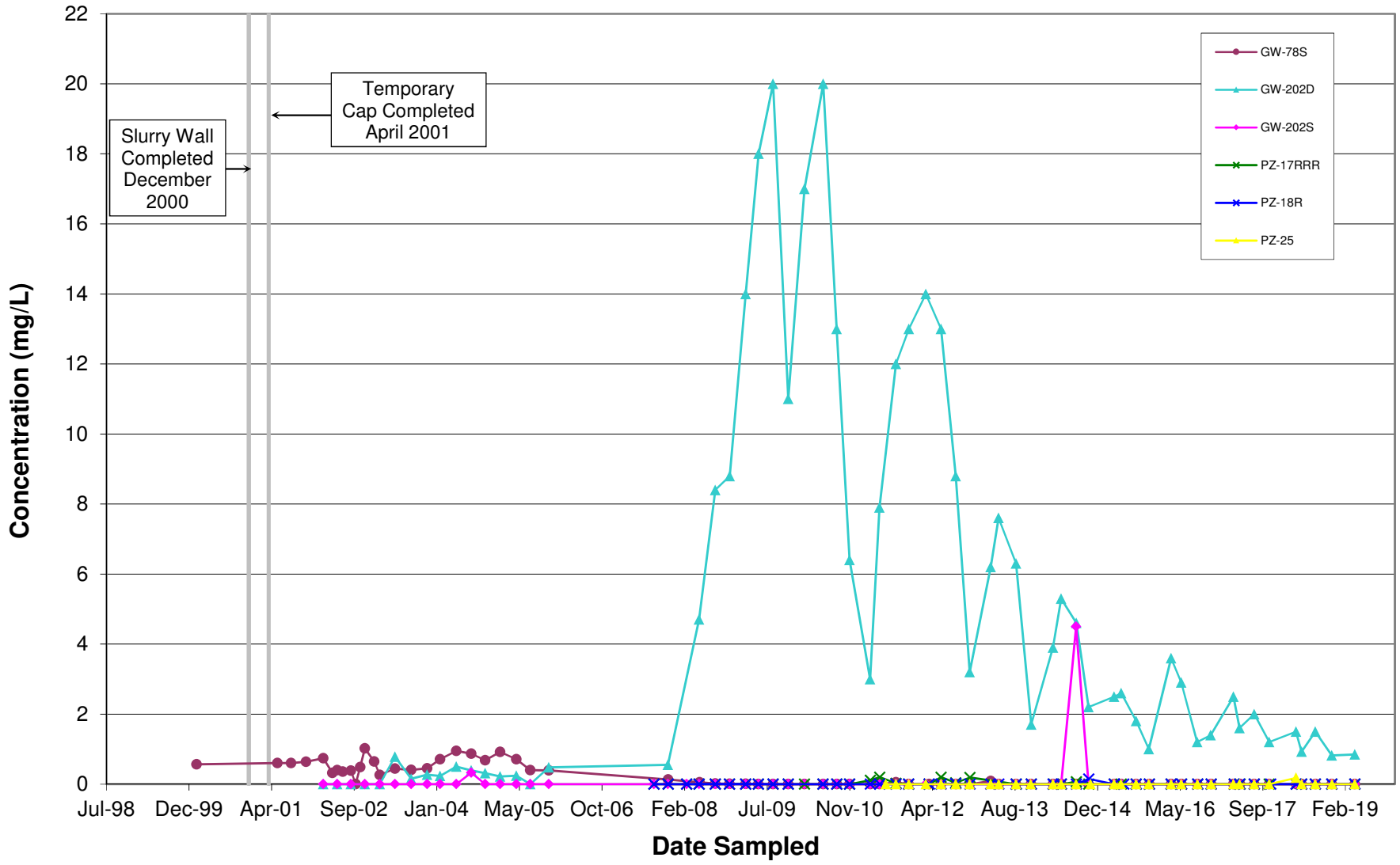
White tail deer were noted near the main area.

Appendix D

Slurry Wall/Cap Groundwater,
Surface Water, and Sediment Time Series Plots

Appendix D1

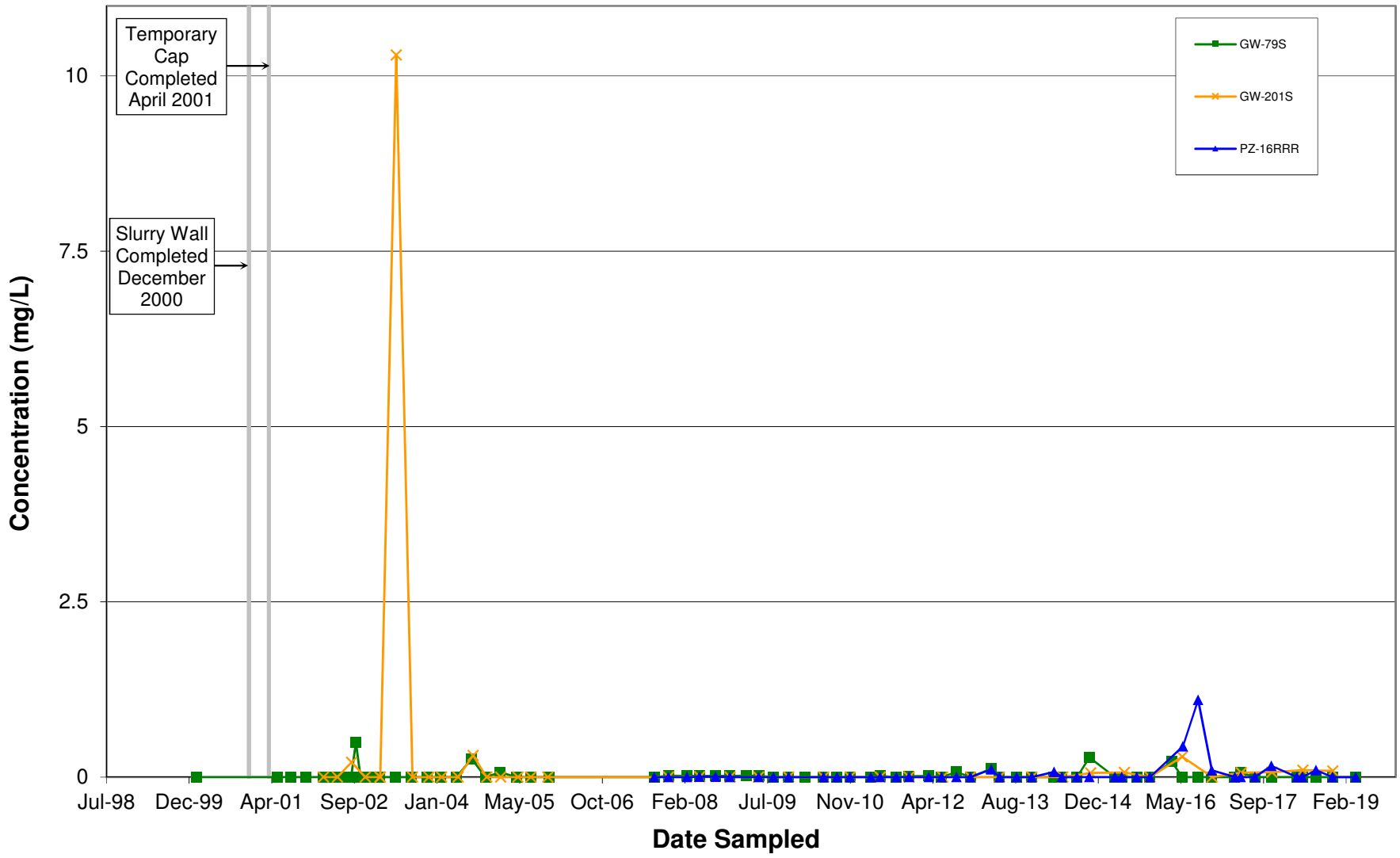
Groundwater
(Aluminum, Ammonia, Chloride, Chromium, Sulfate)



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Aluminum in Groundwater South of Containment Structure Figure D-1.1

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Aluminum GW S

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

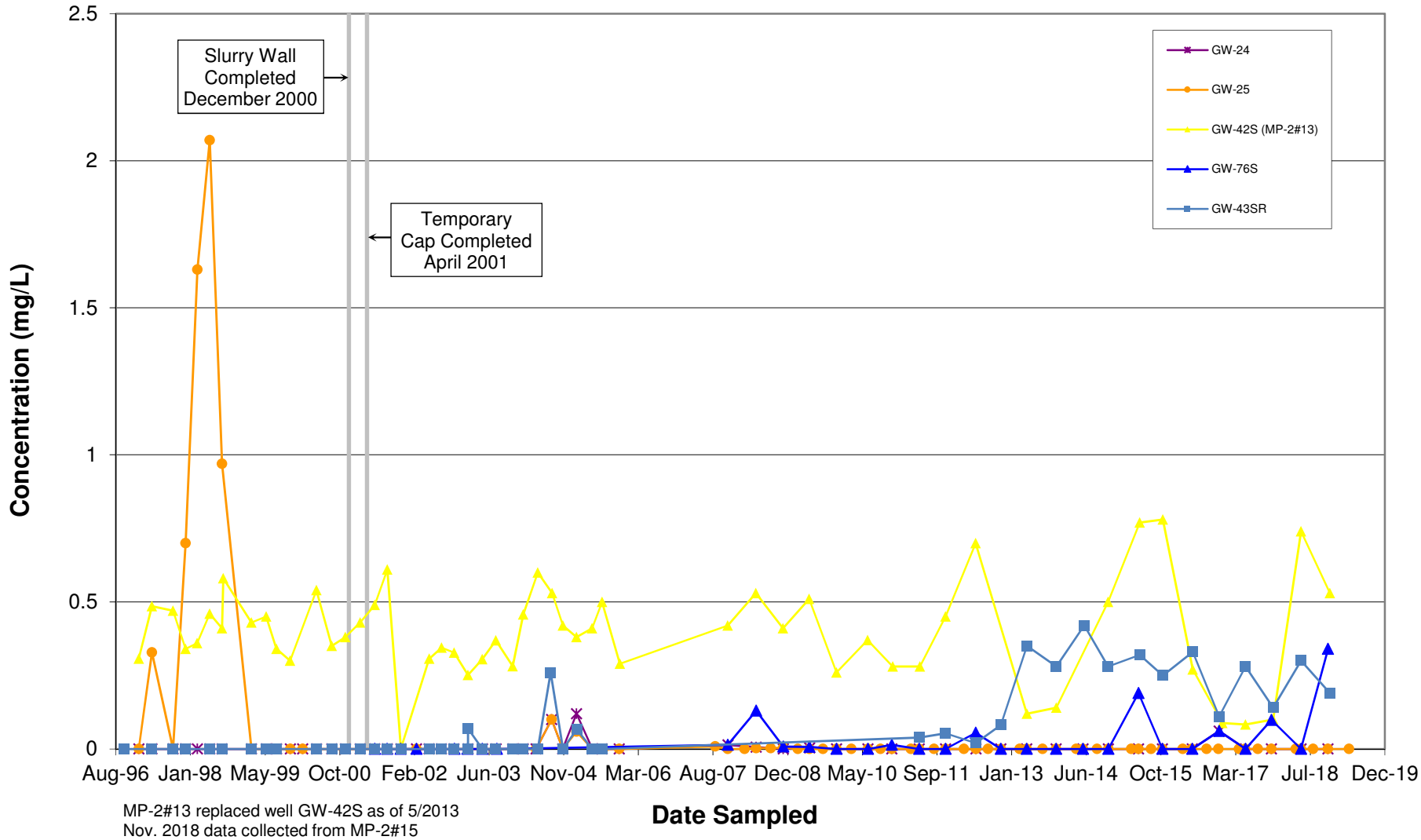
wood.

Filtered Aluminum in Groundwater
Southeast of Containment Structure

Figure D-1.2

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Aluminum GW SE

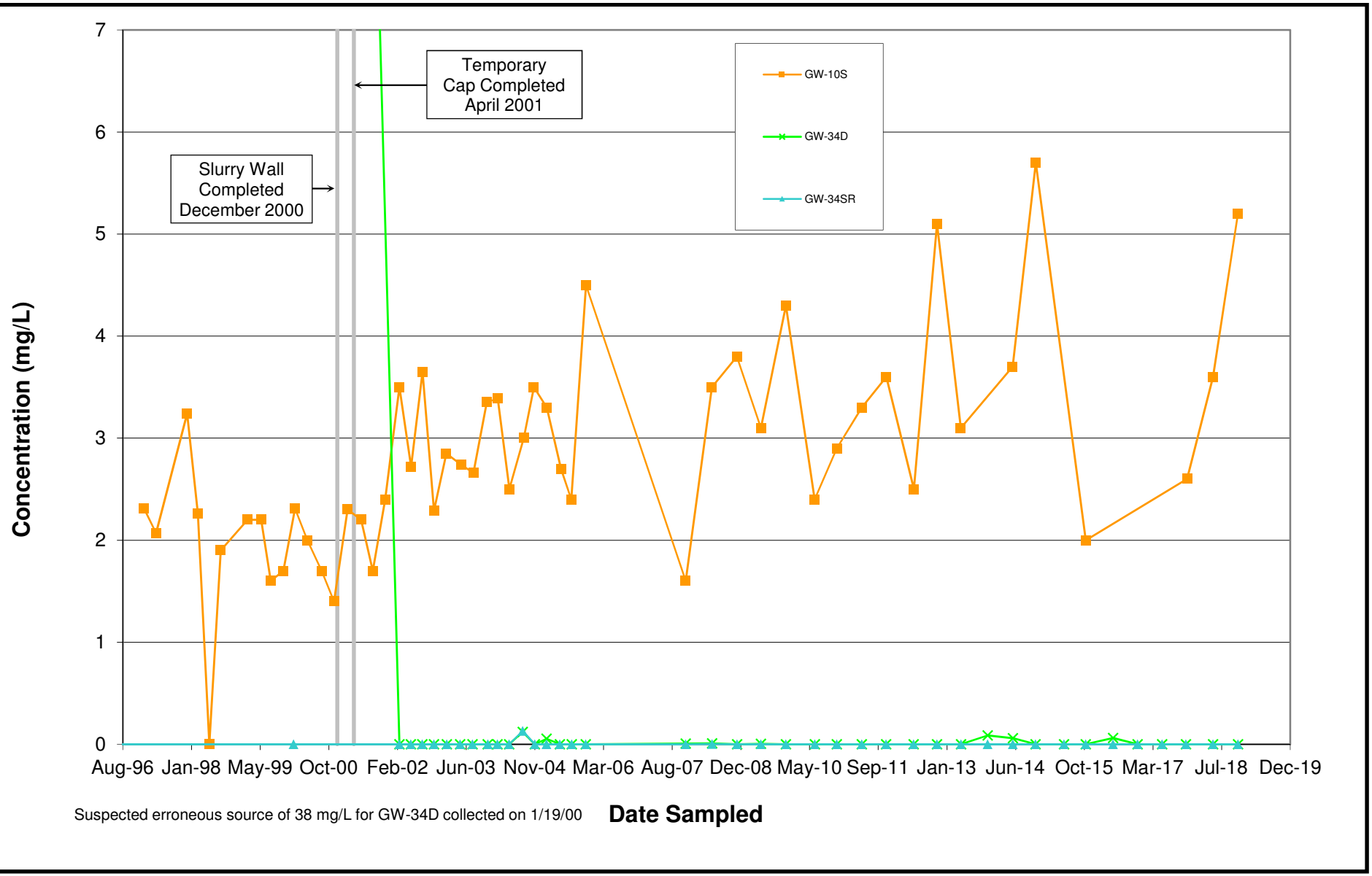
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Aluminum in Groundwater West of Containment Structure Figure D-1.3

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Aluminum GW W

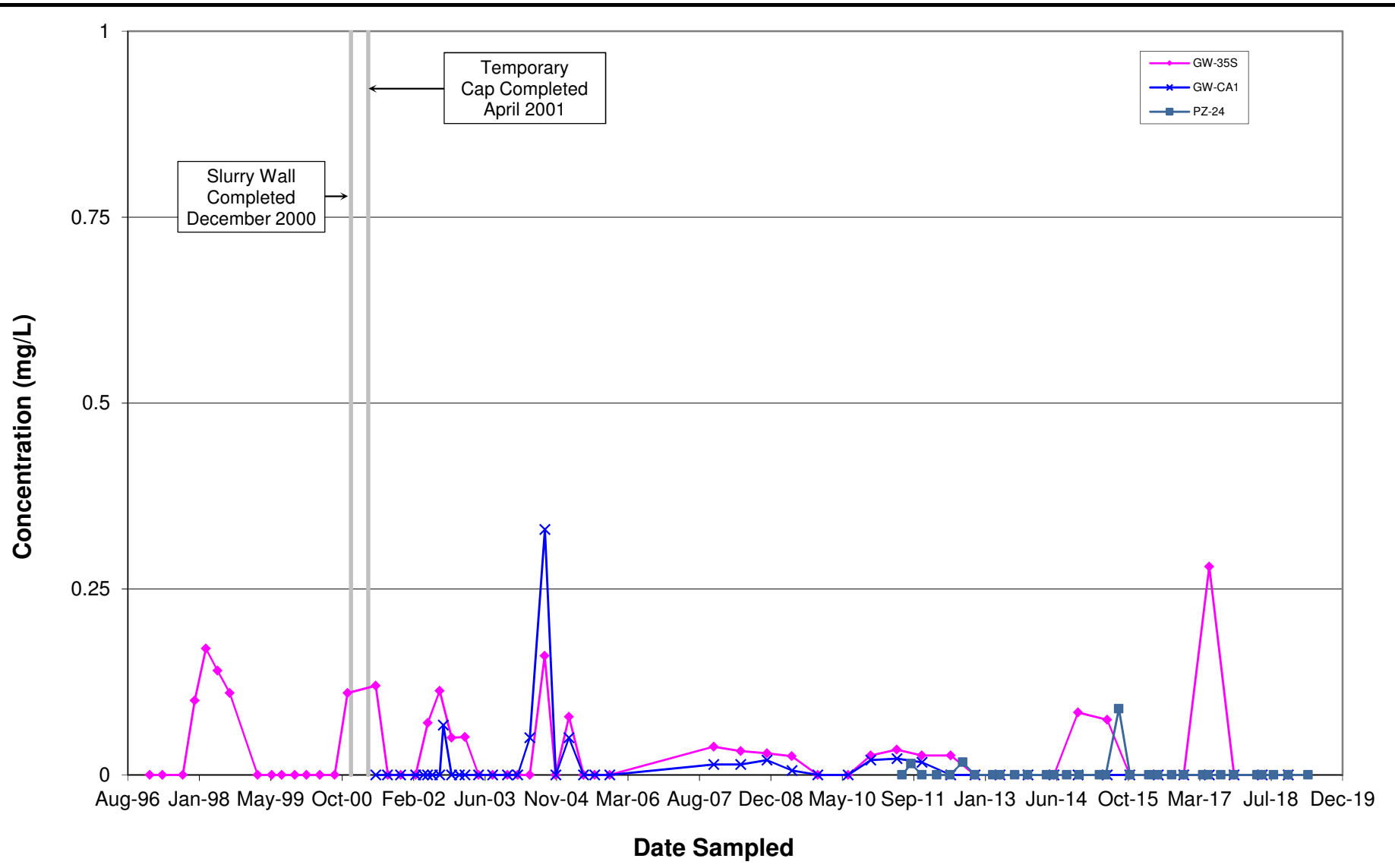
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Aluminum in Groundwater North of Containment Structure Figure D-1.4

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Aluminum GW N

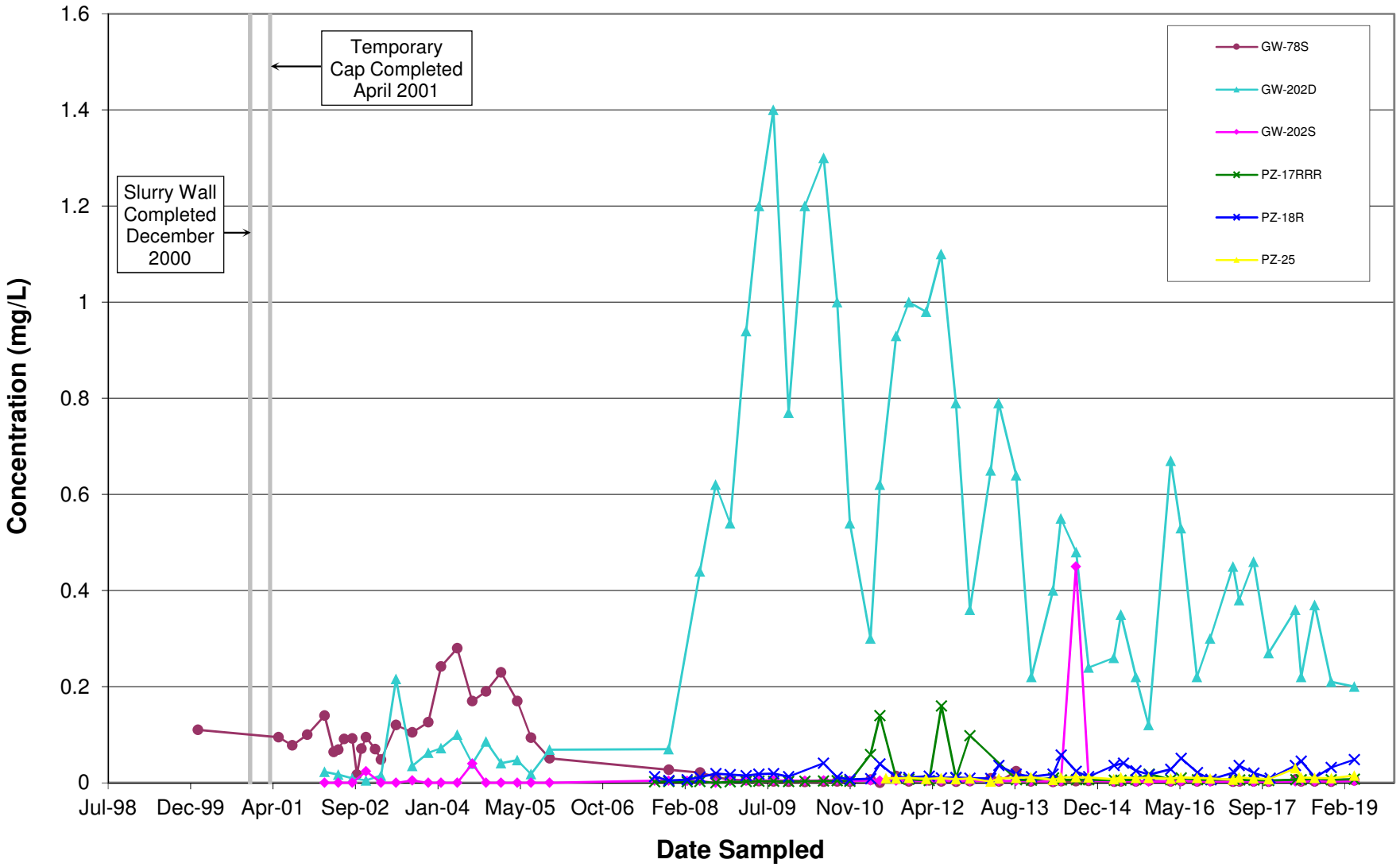
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Aluminum in Groundwater Inside Containment Structure Figure D-1.5

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Aluminum Inside

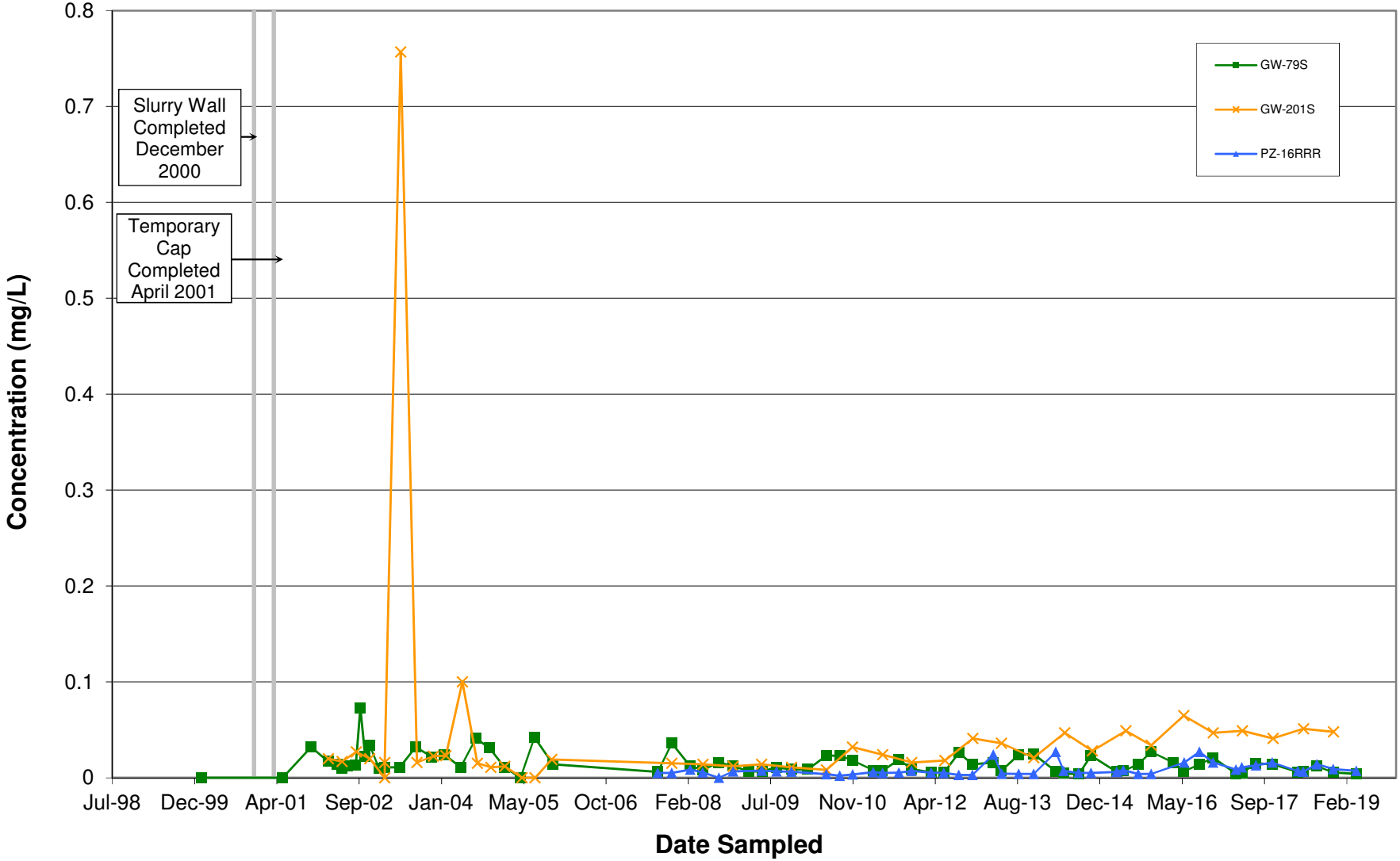
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Chromium in Groundwater South of Containment Structure Figure D-1.6

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium GW S

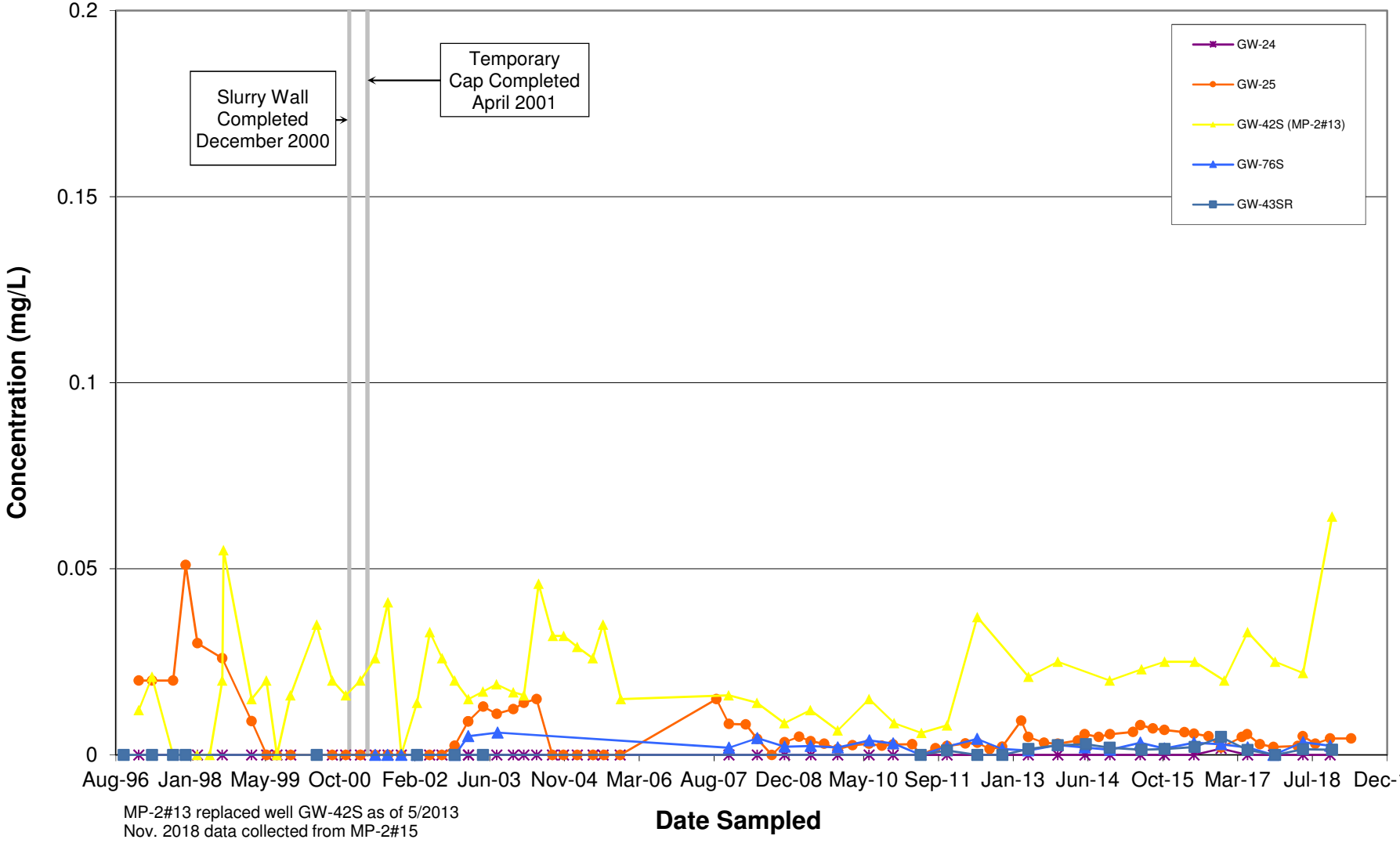
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Chromium in Groundwater Southeast of Containment Structure Figure D-1.7

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium GW SE

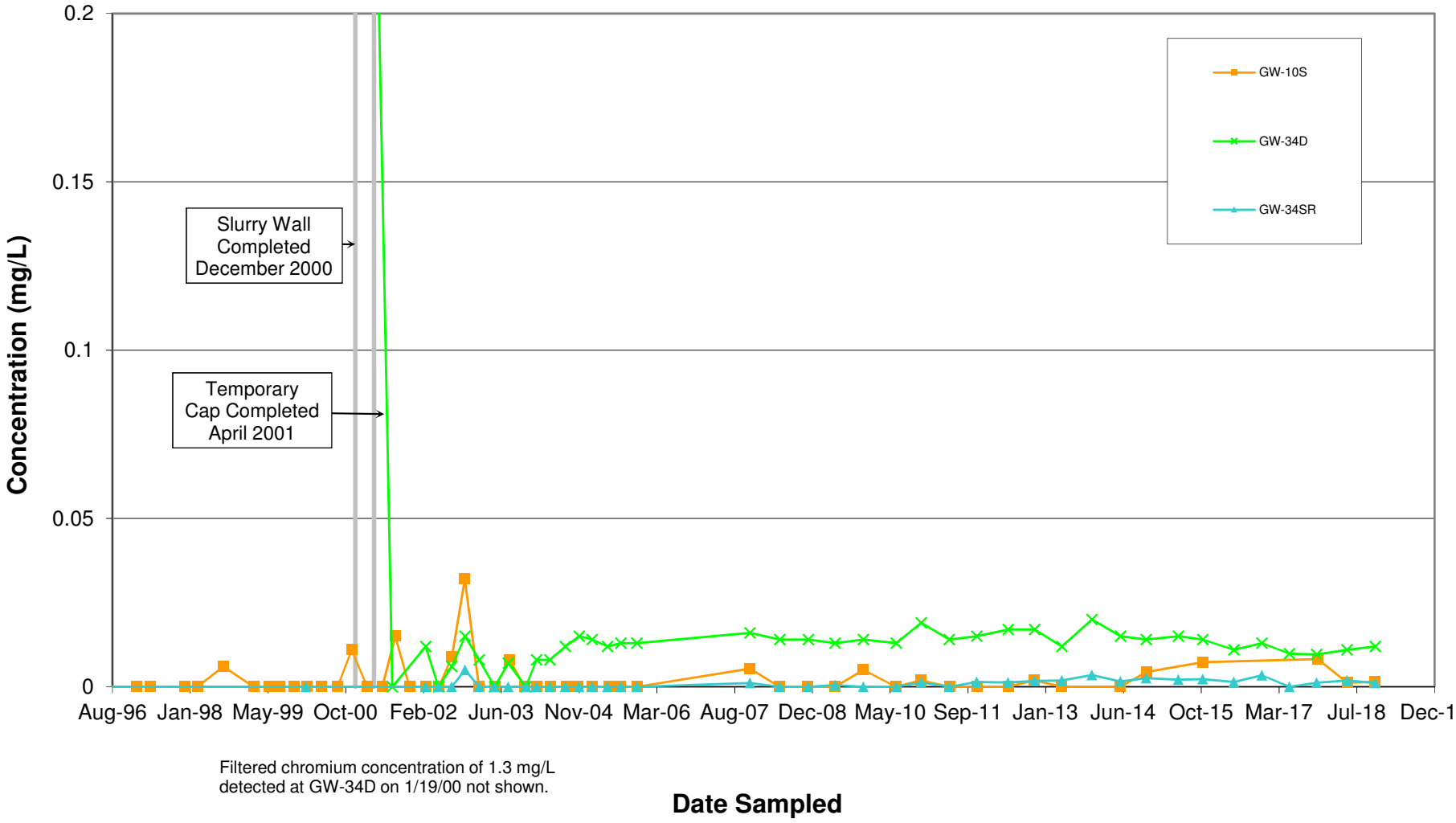
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Chromium in Groundwater West of Containment Structure Figure D-1.8

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium GW W

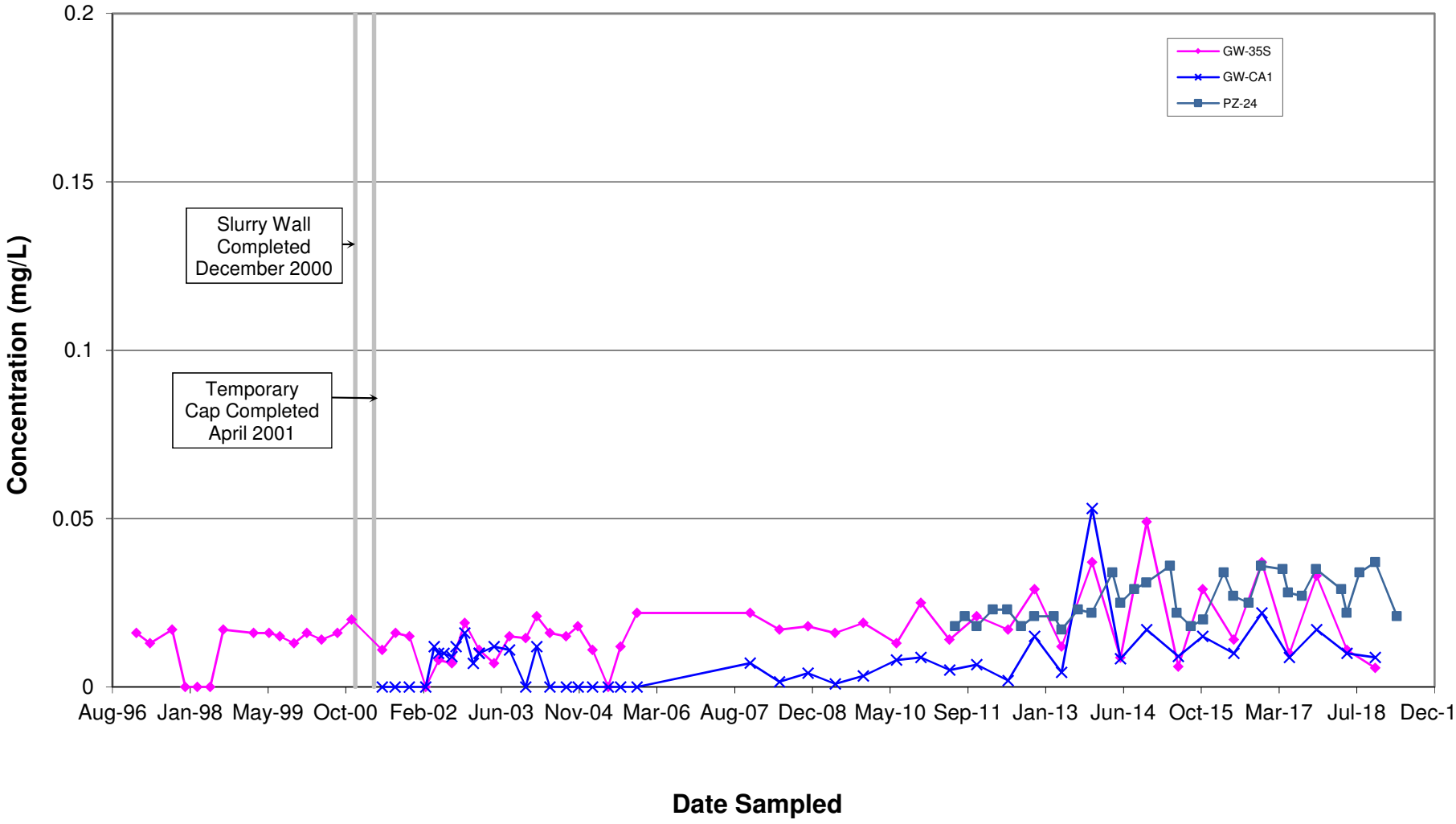
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Chromium in Groundwater North of Containment Structure Figure D-1.9

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium GW N

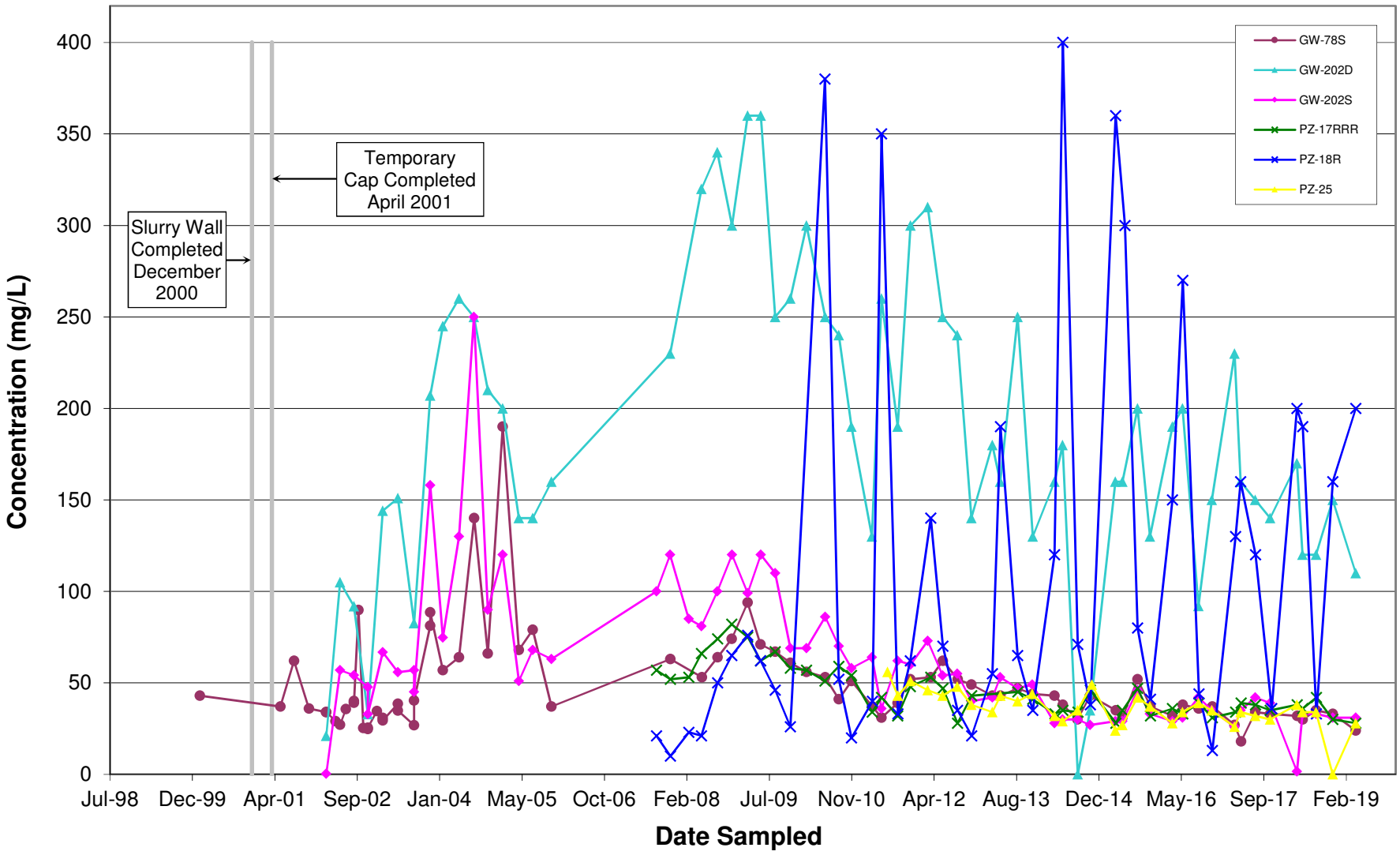
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Chromium in Groundwater Inside Containment Structure Figure D-1.10

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Dis Chromium Inside

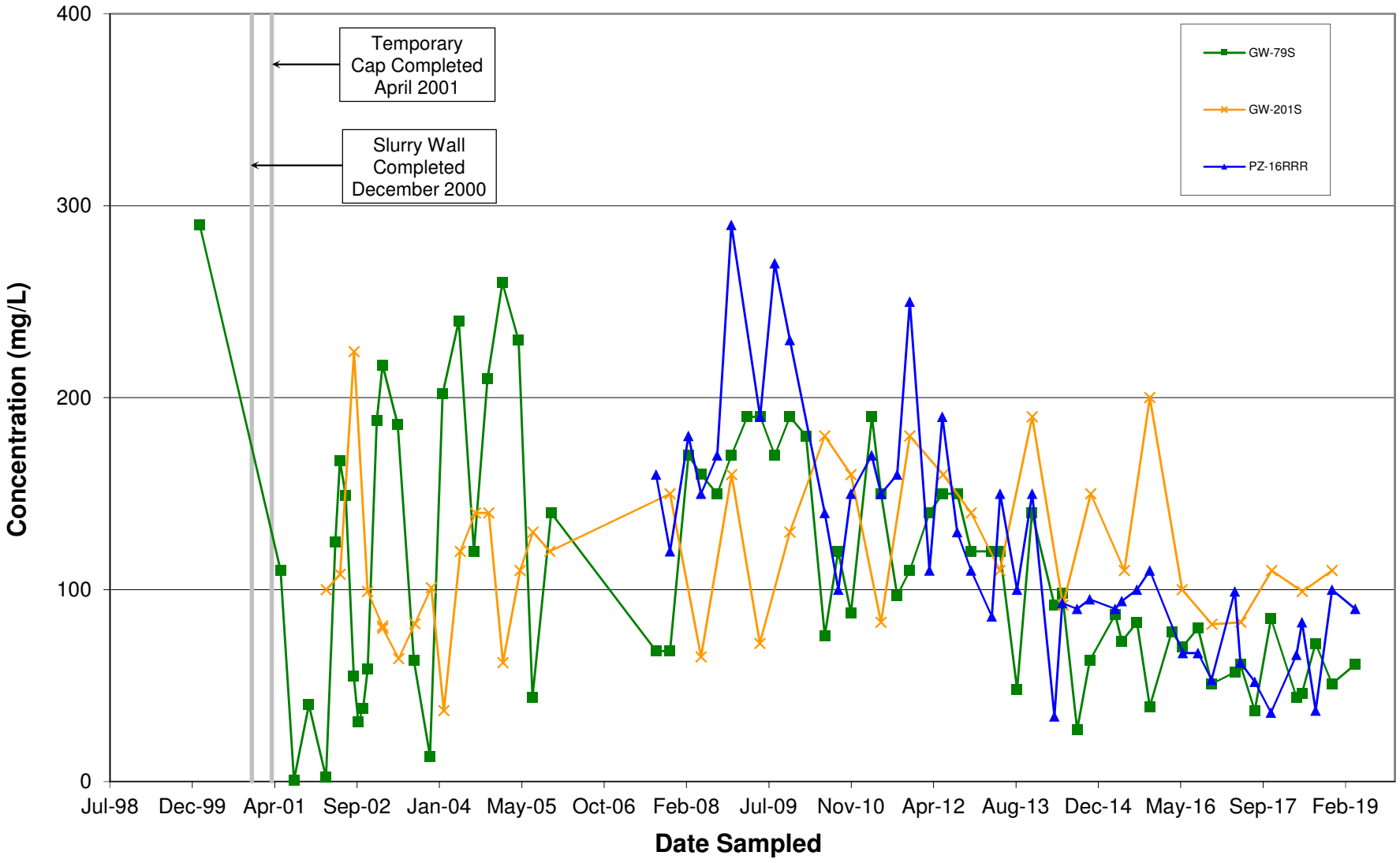
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Ammonia in Groundwater South of Containment Structure Figure D-1.11

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Ammonia GW S

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

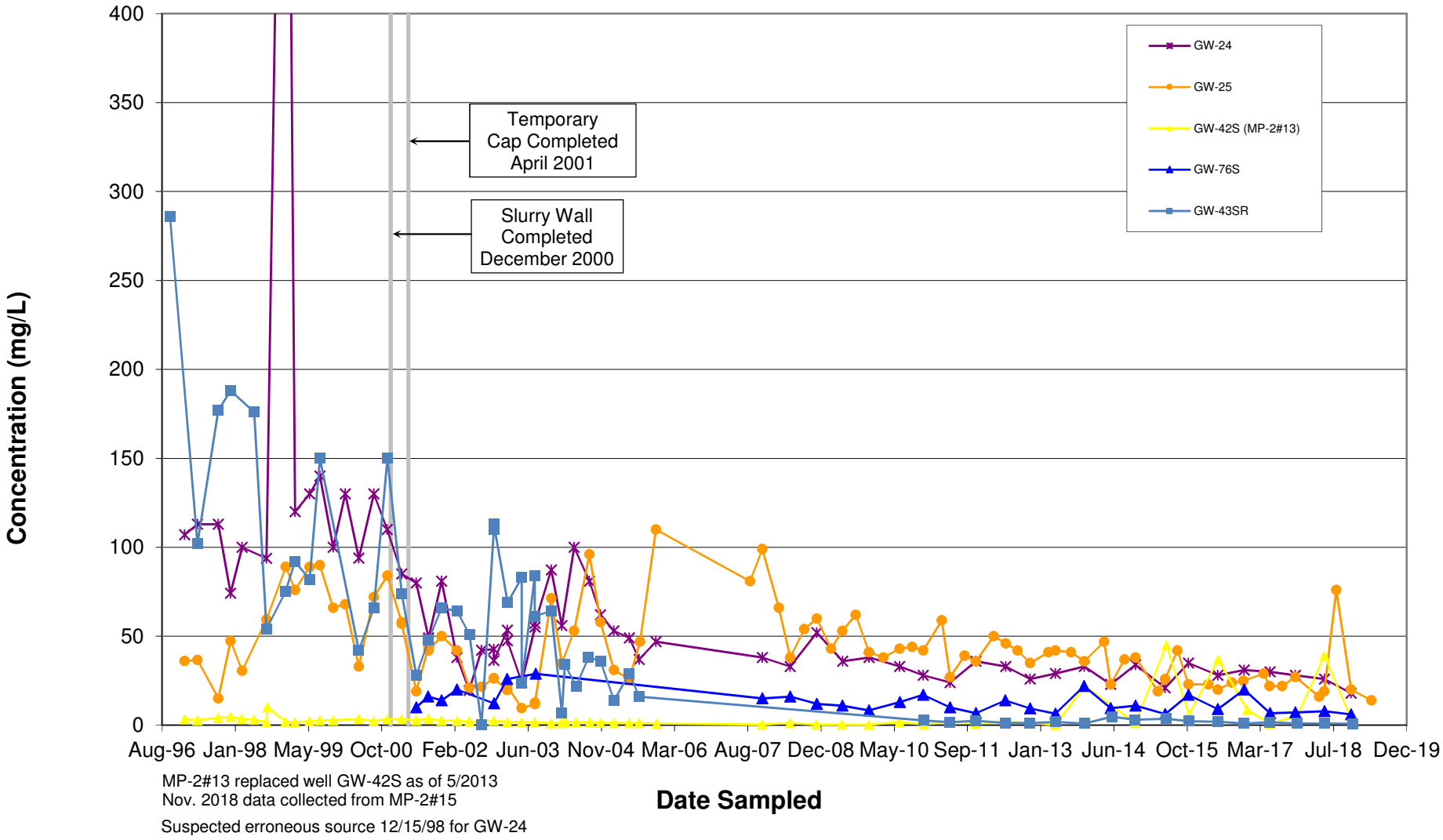
wood.

Ammonia in Groundwater
Southeast of Containment Structure

Figure D-1.12

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Ammonia GW SE

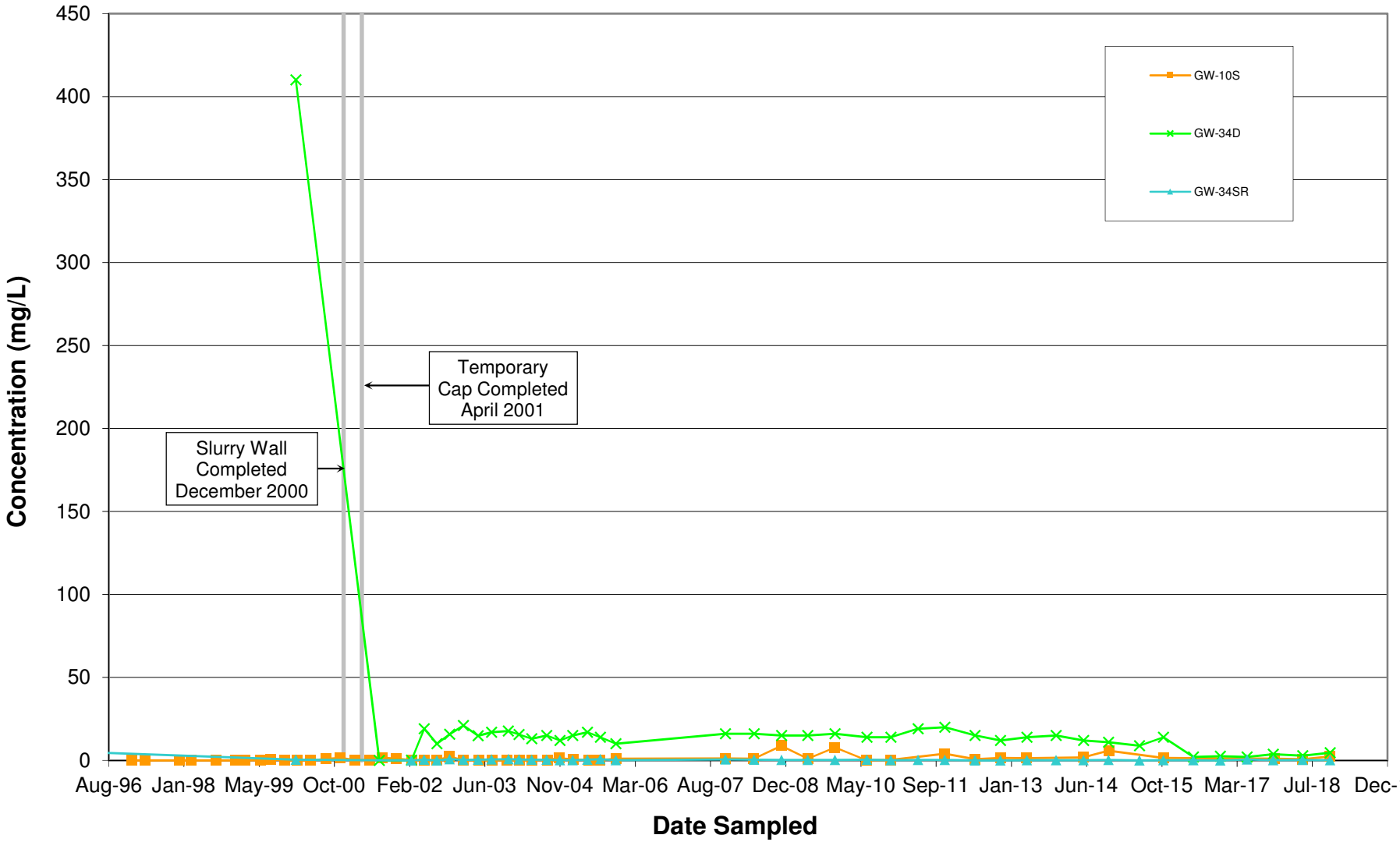
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Ammonia in Groundwater West of Containment Structure Figure D-1.13

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Ammonia GW W

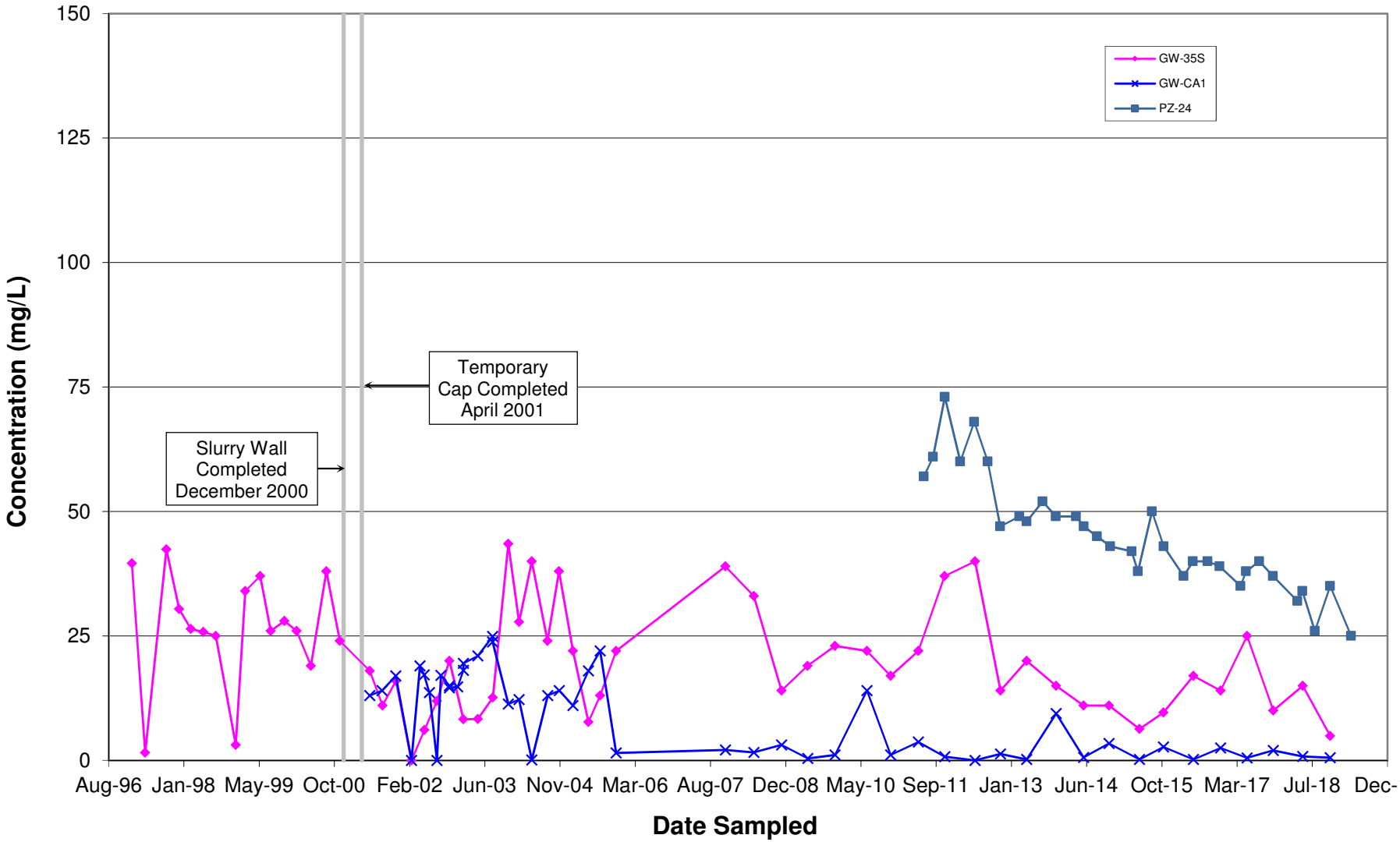
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Ammonia in Groundwater North of Containment Structure Figure D-1.14

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Ammonia GW N

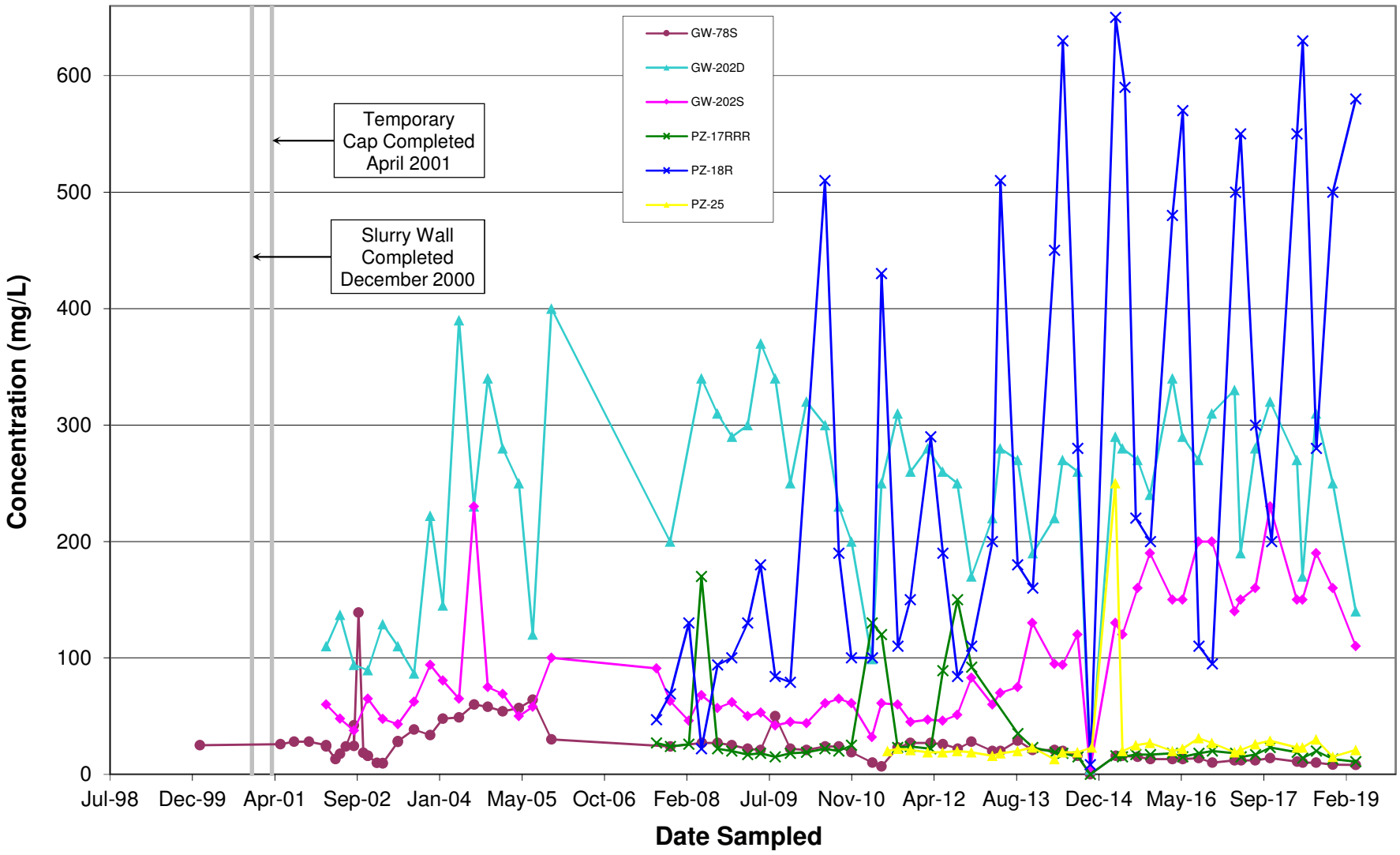
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Ammonia in Groundwater Inside Containment Structure Figure D-1.15

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Ammonia Inside

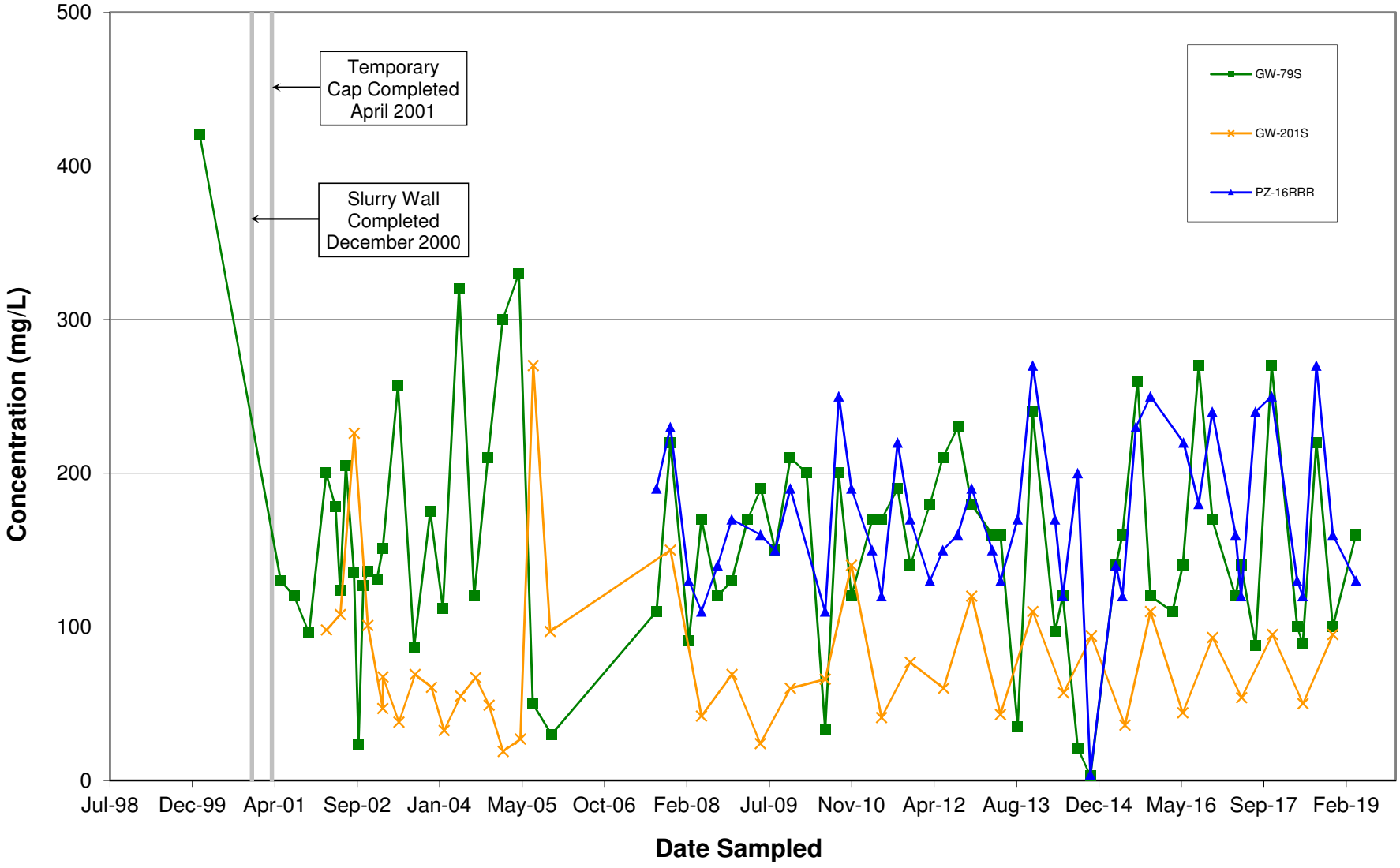
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Chloride in Groundwater South of Containment Structure Figure D-1.16

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Chloride GW S

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

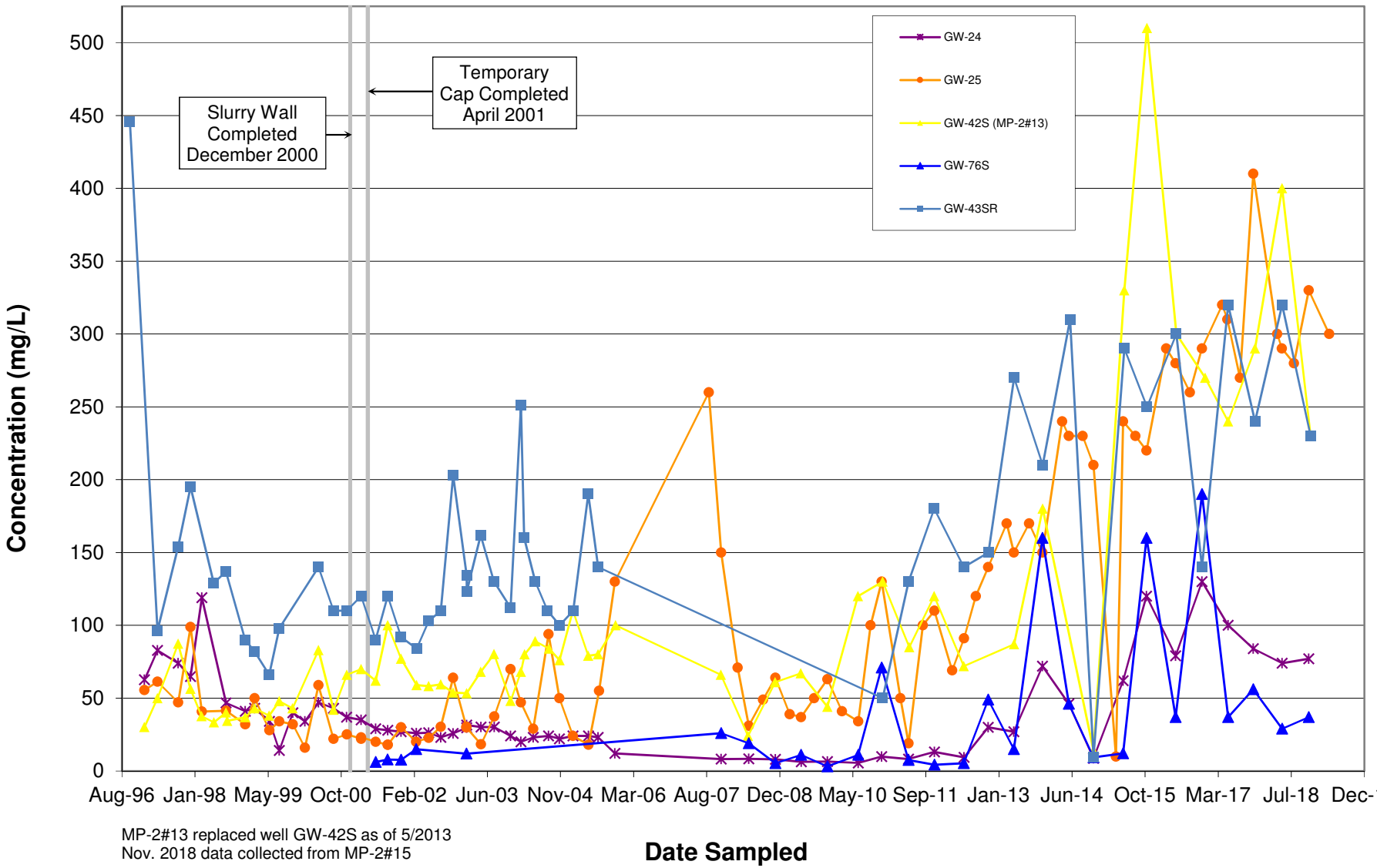
wood.

Chloride in Groundwater
Southeast of Containment Structure

Figure D-1.17

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Chloride GW SE

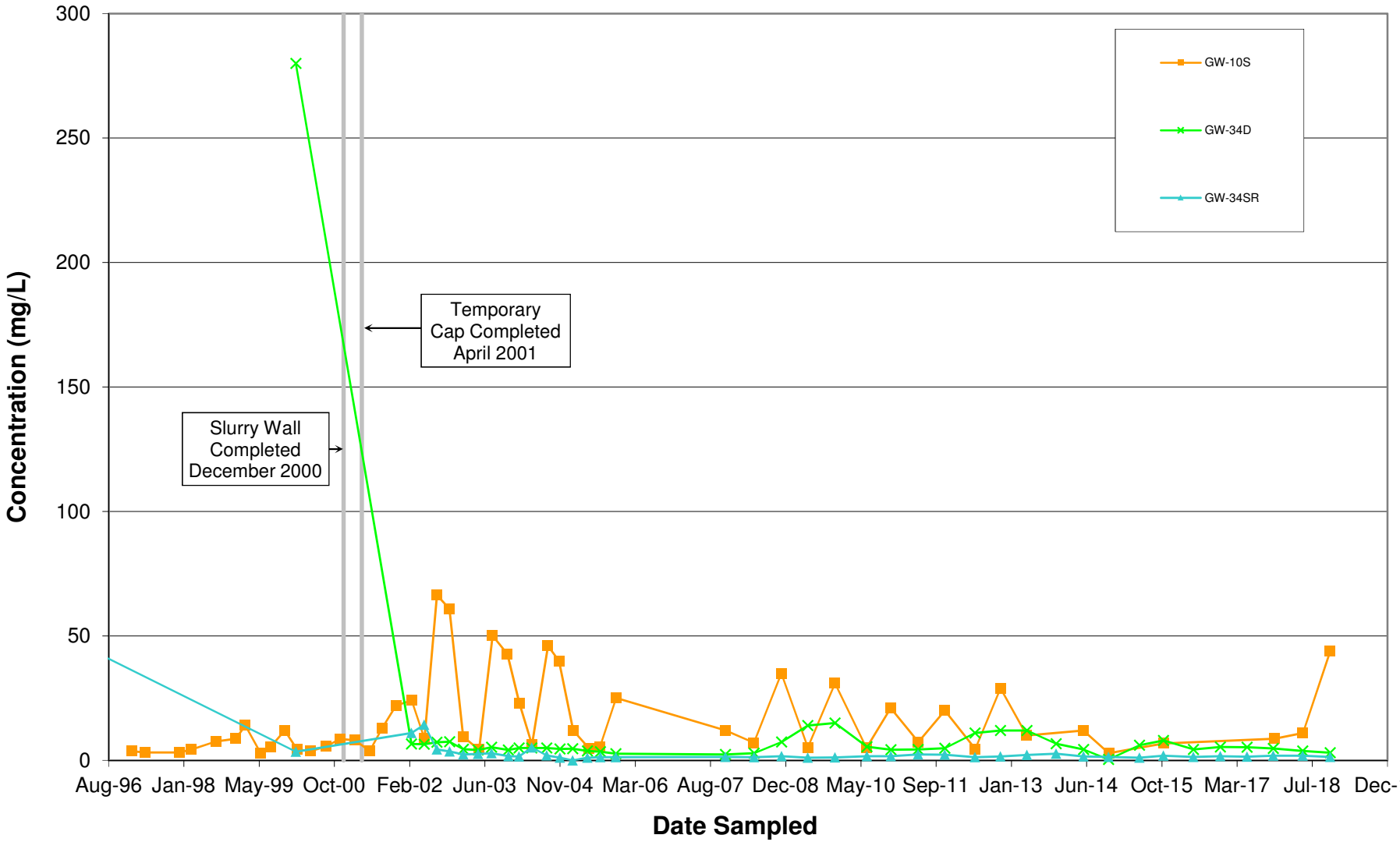
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Chloride in Groundwater West of Containment Structure Figure D-1.18

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Chloride GW W

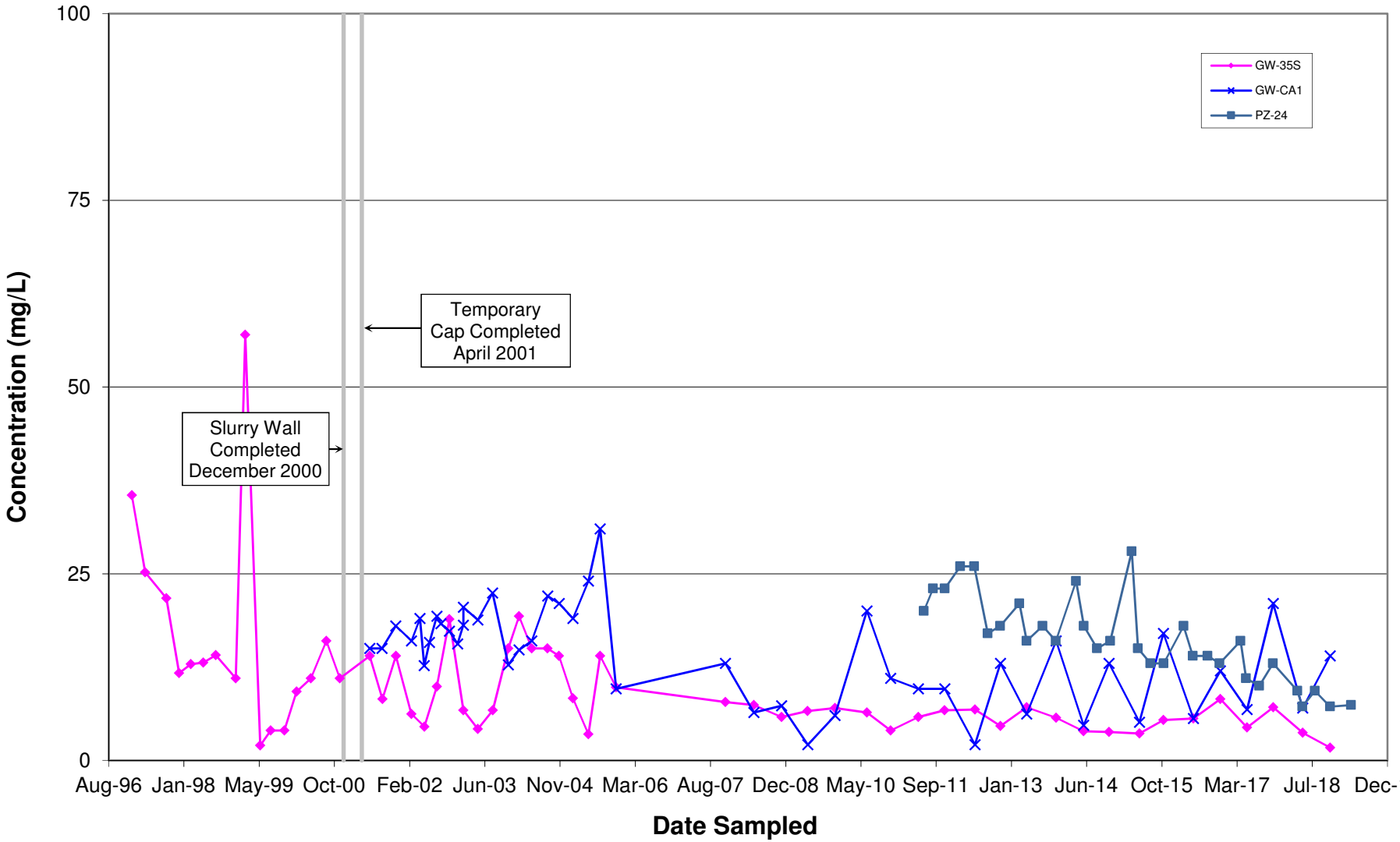
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Chloride in Groundwater North of Containment Structure Figure D-1.19

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Chloride GW N

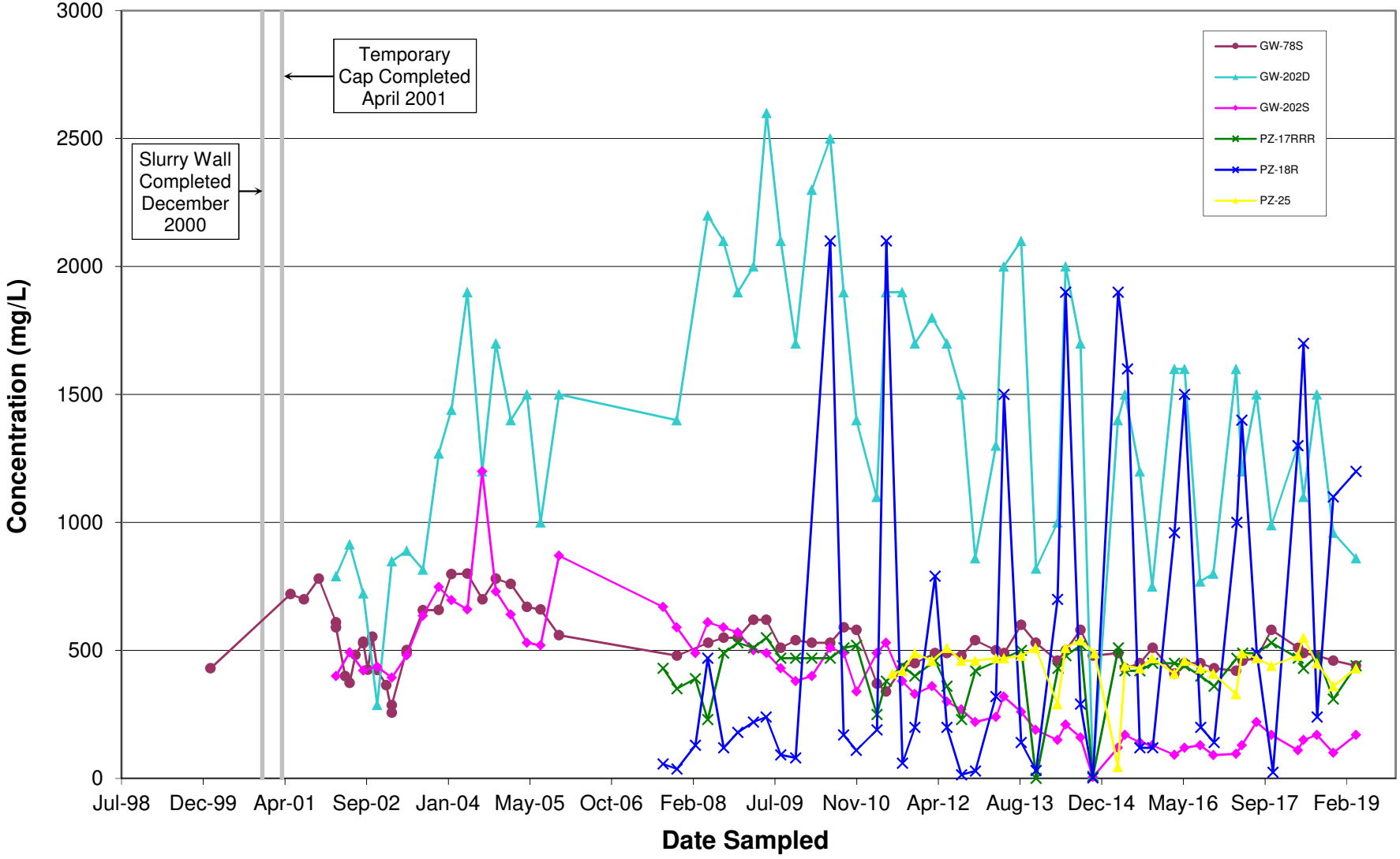
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Chloride in Groundwater Inside Containment Structure Figure D-1.20

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Chloride Inside

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

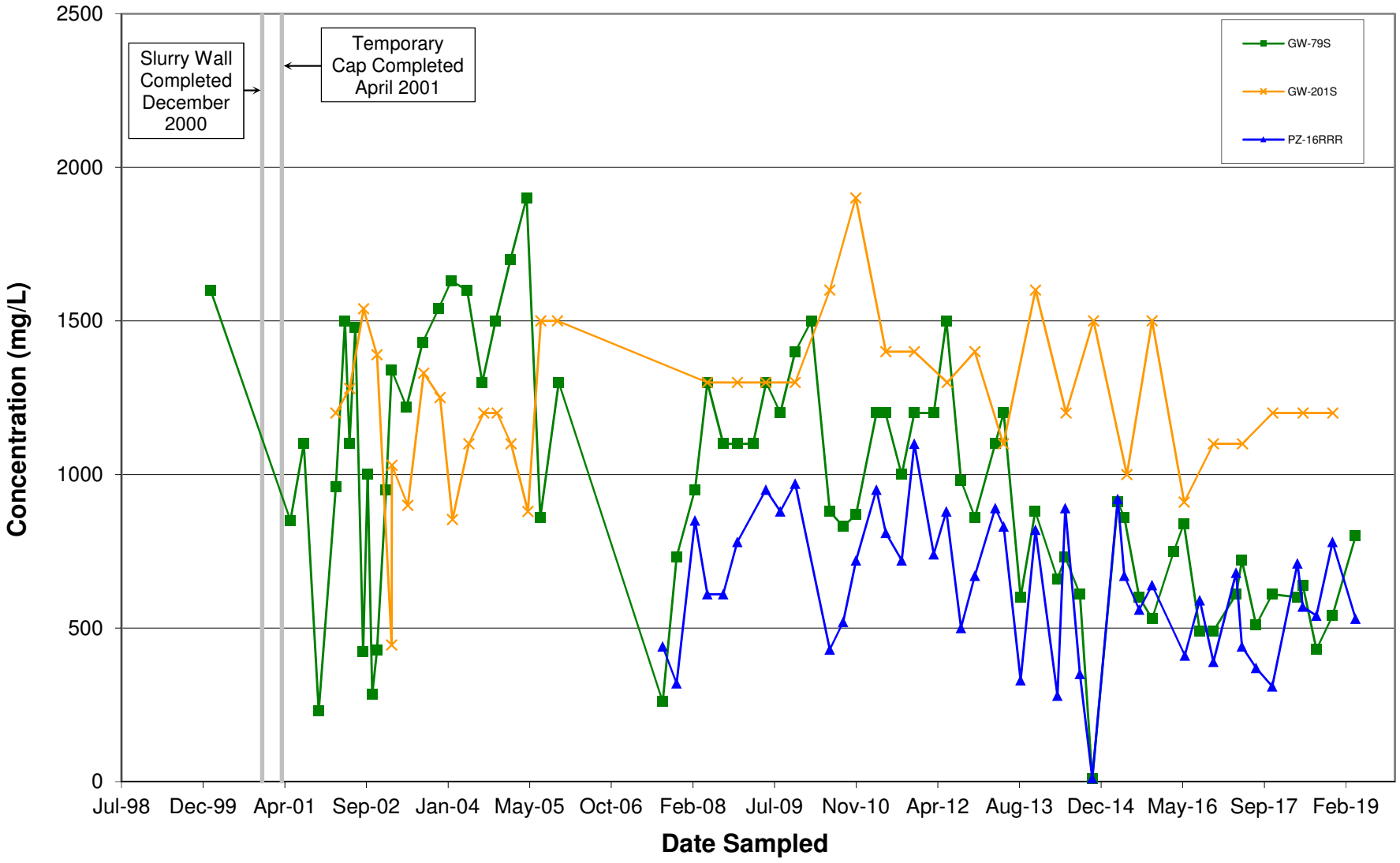
wood.

Sulfate in Groundwater
South of Containment Structure

Figure D-1.21

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Sulfate GW S

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

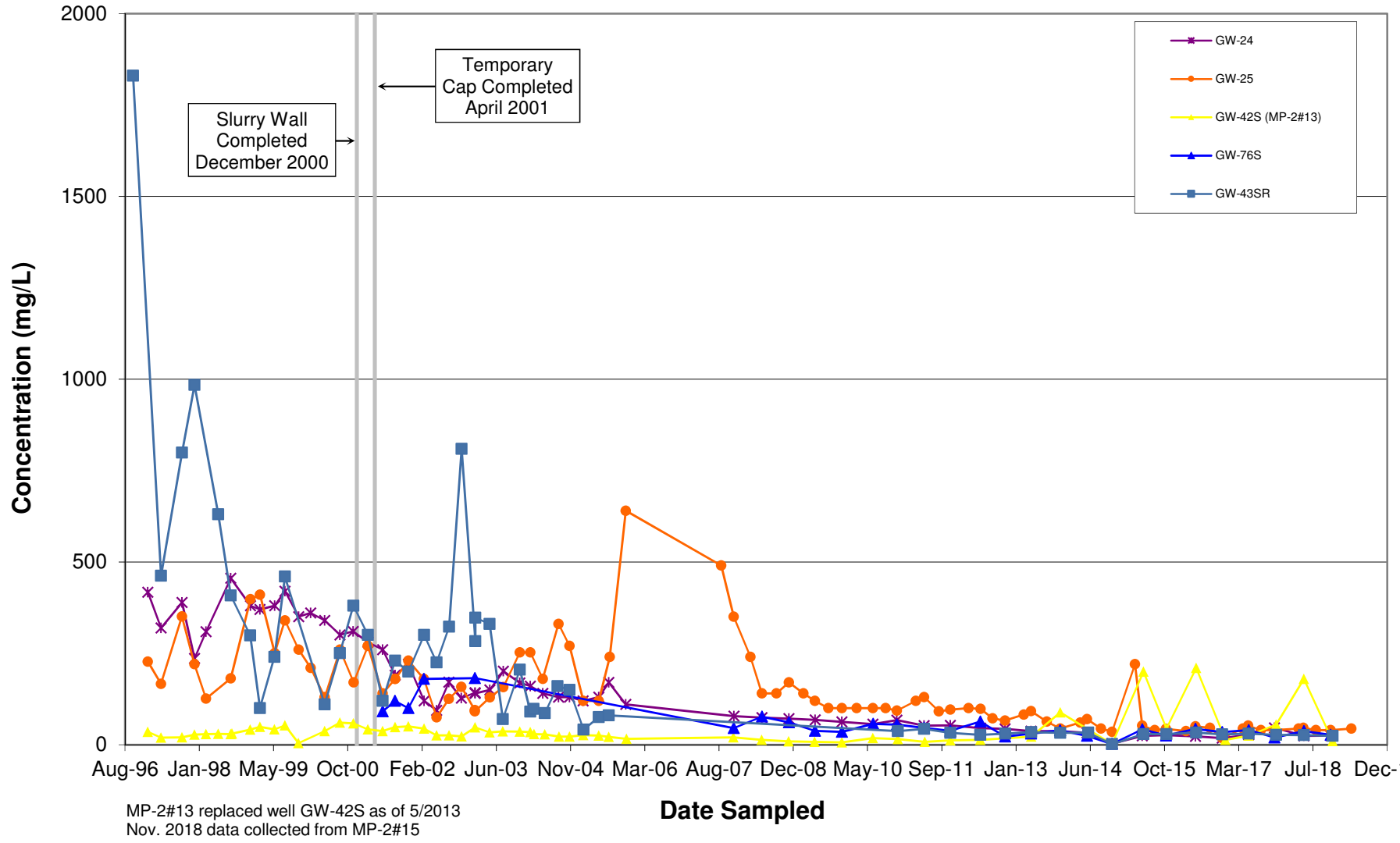
wood.

Sulfate in Groundwater
Southeast of Containment Structure

Figure D-1.22

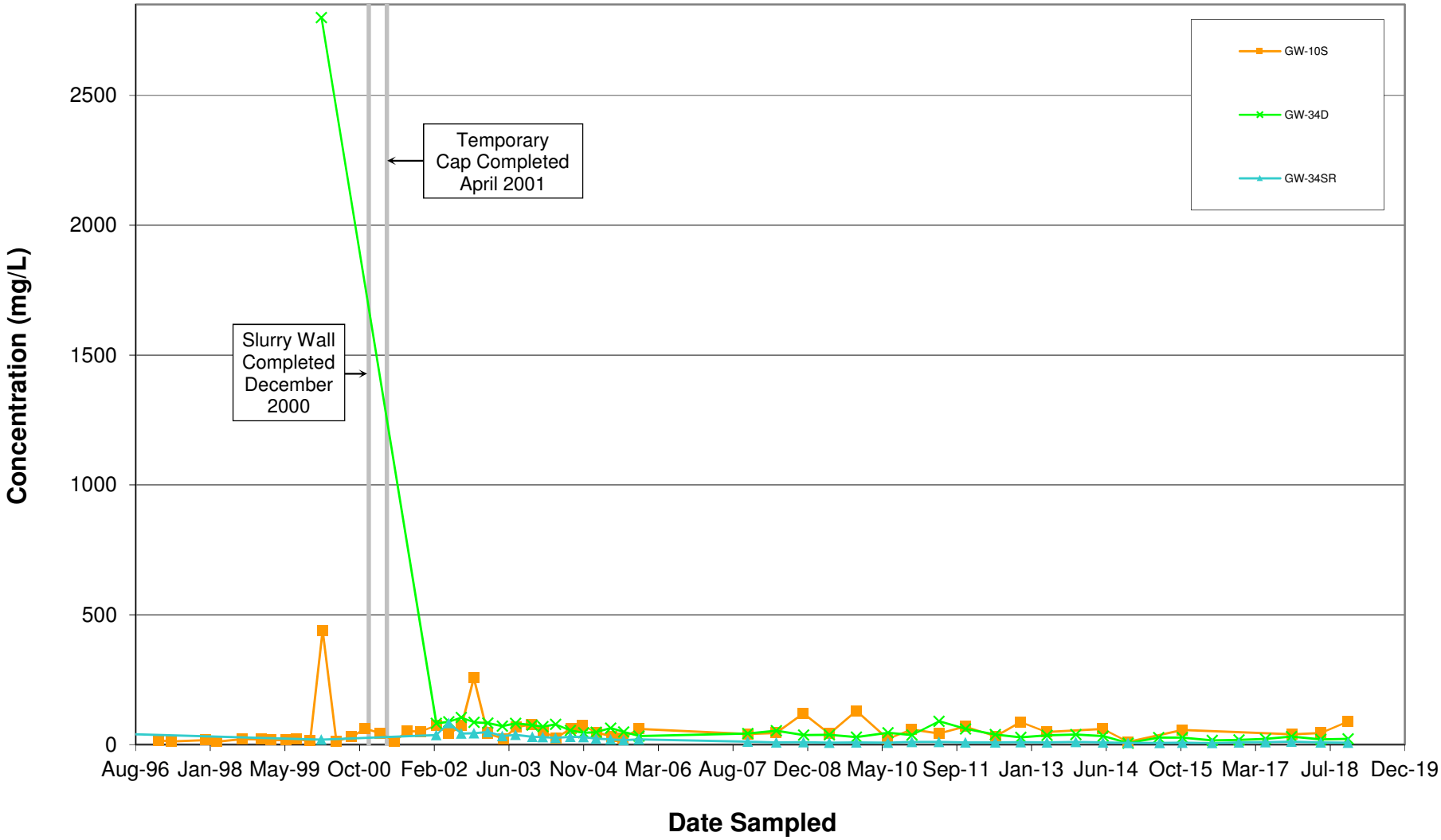
\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Sulfate GW SE

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



MP-2#13 replaced well GW-42S as of 5/2013
Nov. 2018 data collected from MP-2#15

Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Sulfate in Groundwater West of Containment Structure Figure D-1.23



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

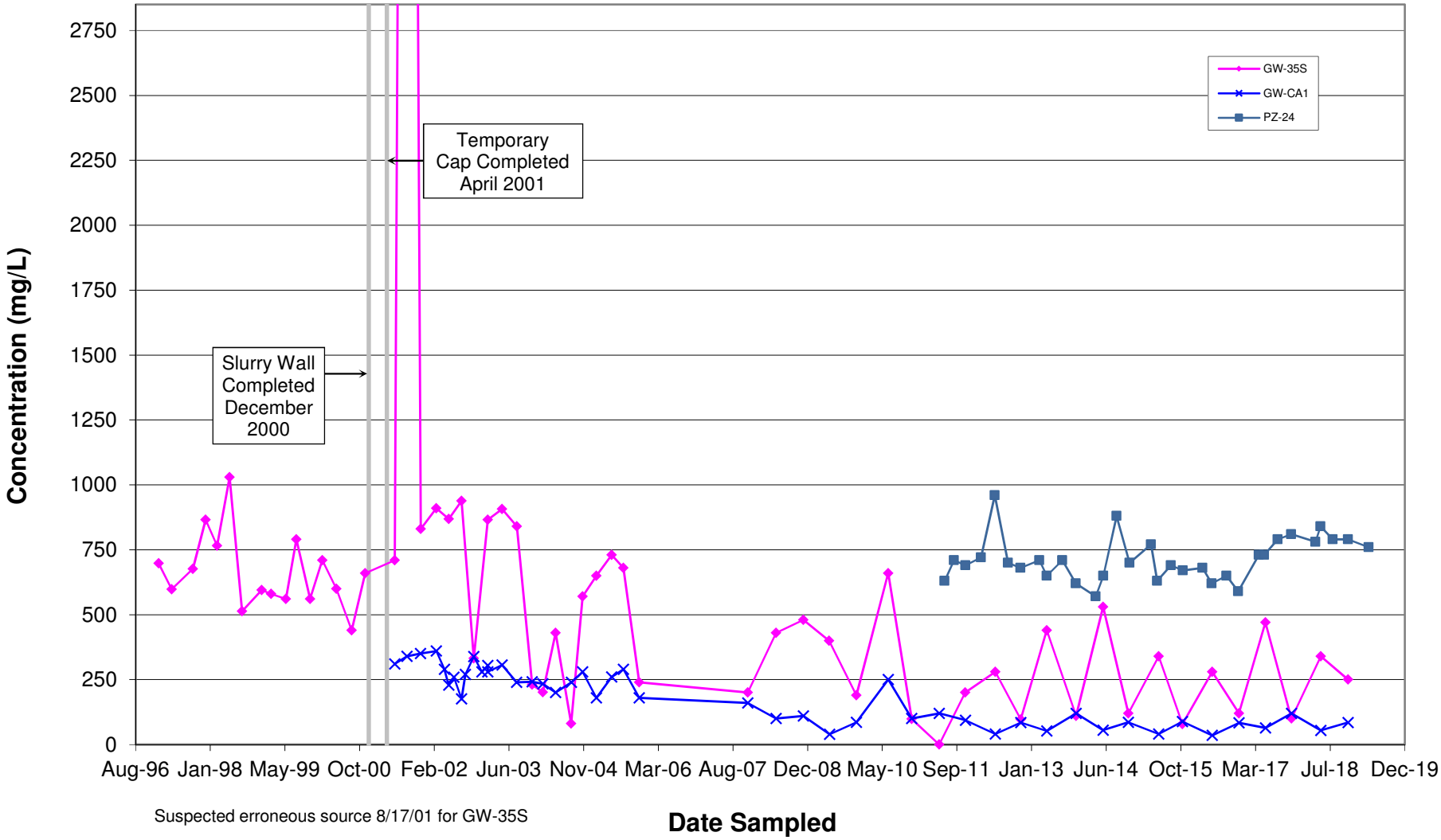
wood.

Sulfate in Groundwater
North of Containment Structure

Figure D-1.24

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Sulfate GW N

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

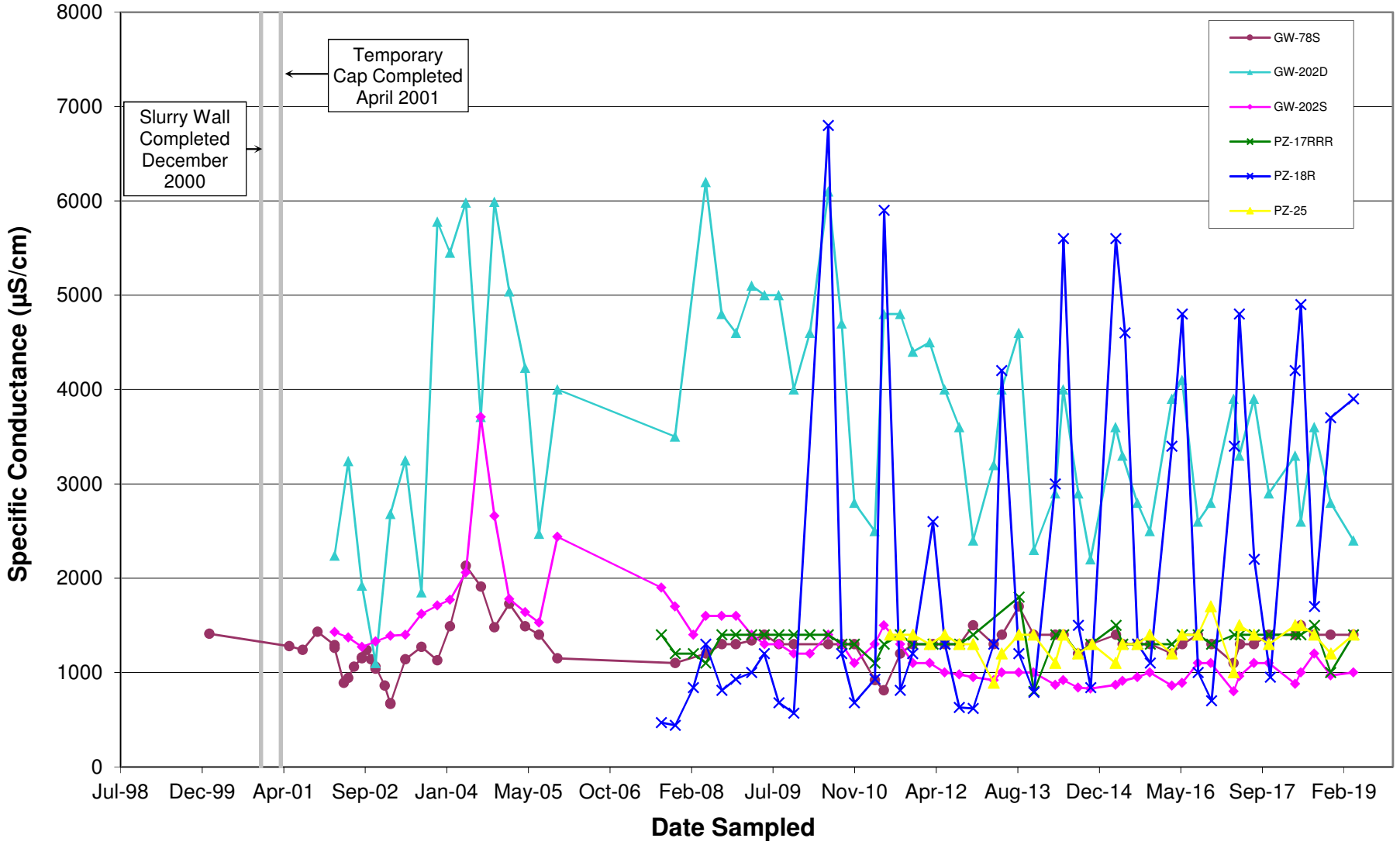
wood.

Sulfate in Groundwater
Inside Containment Structure

Figure D-1.25

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Sulfate Inside

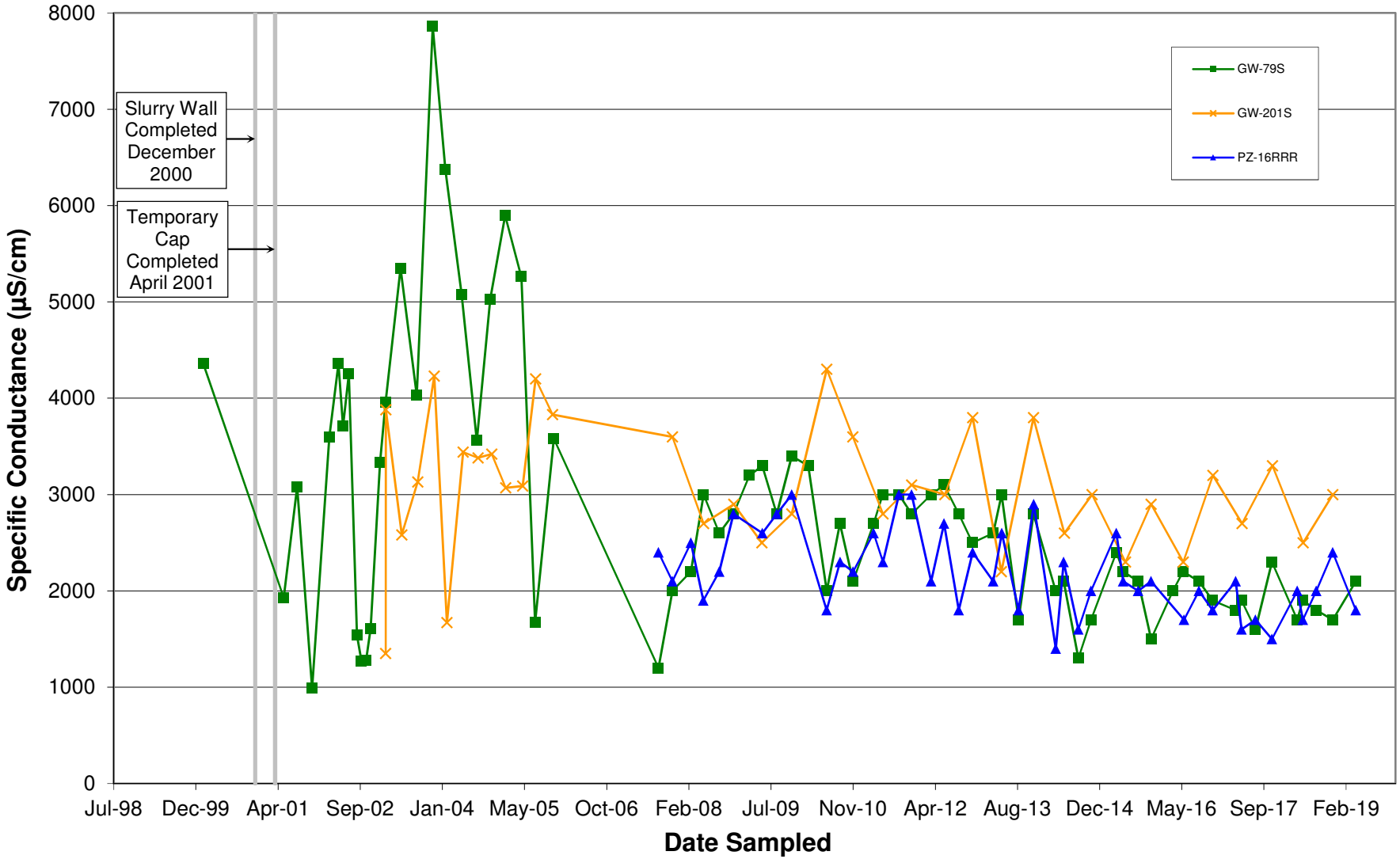
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Specific Conductance in Groundwater South of Containment Structure Figure D-1.26

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance GW S

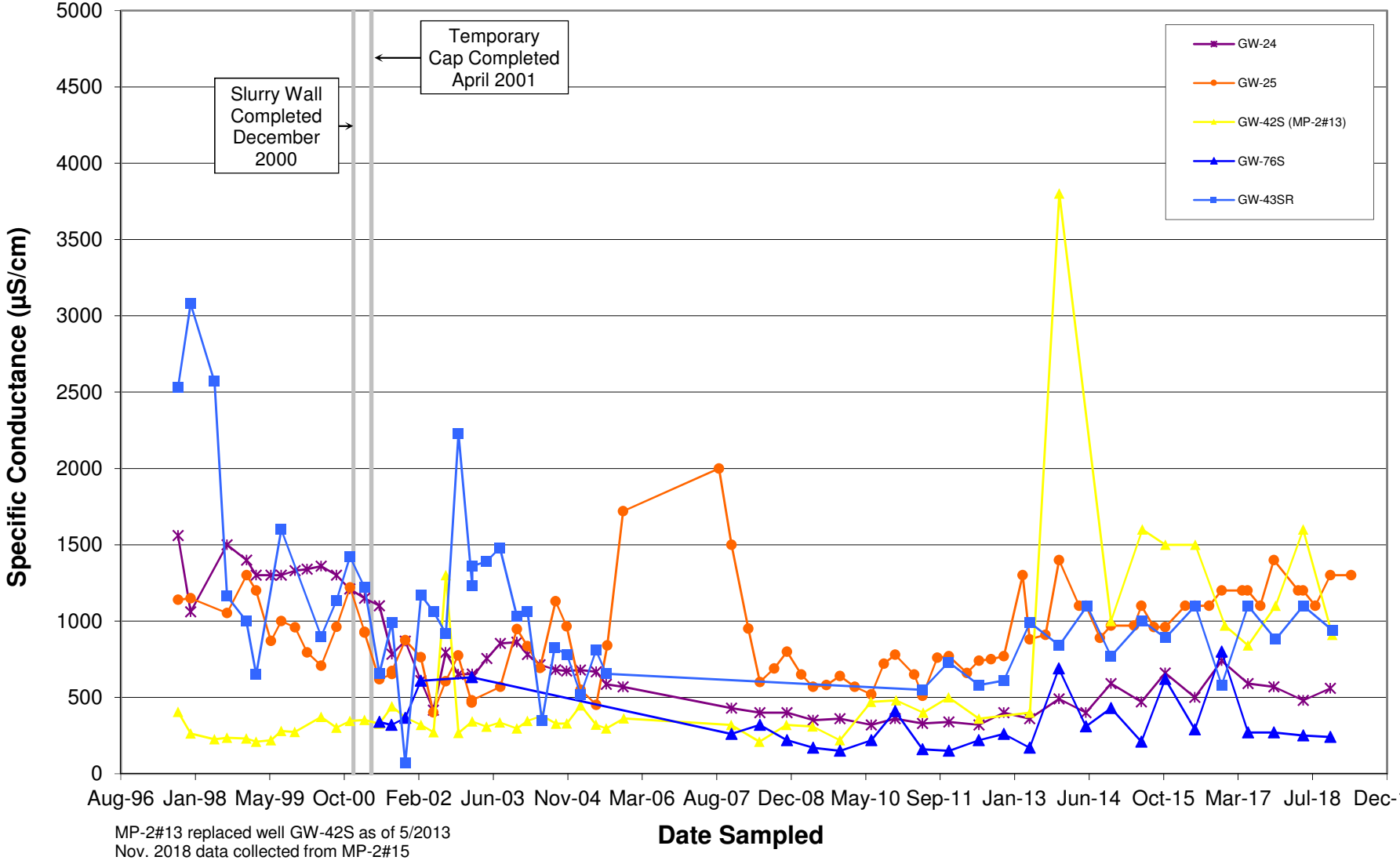
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



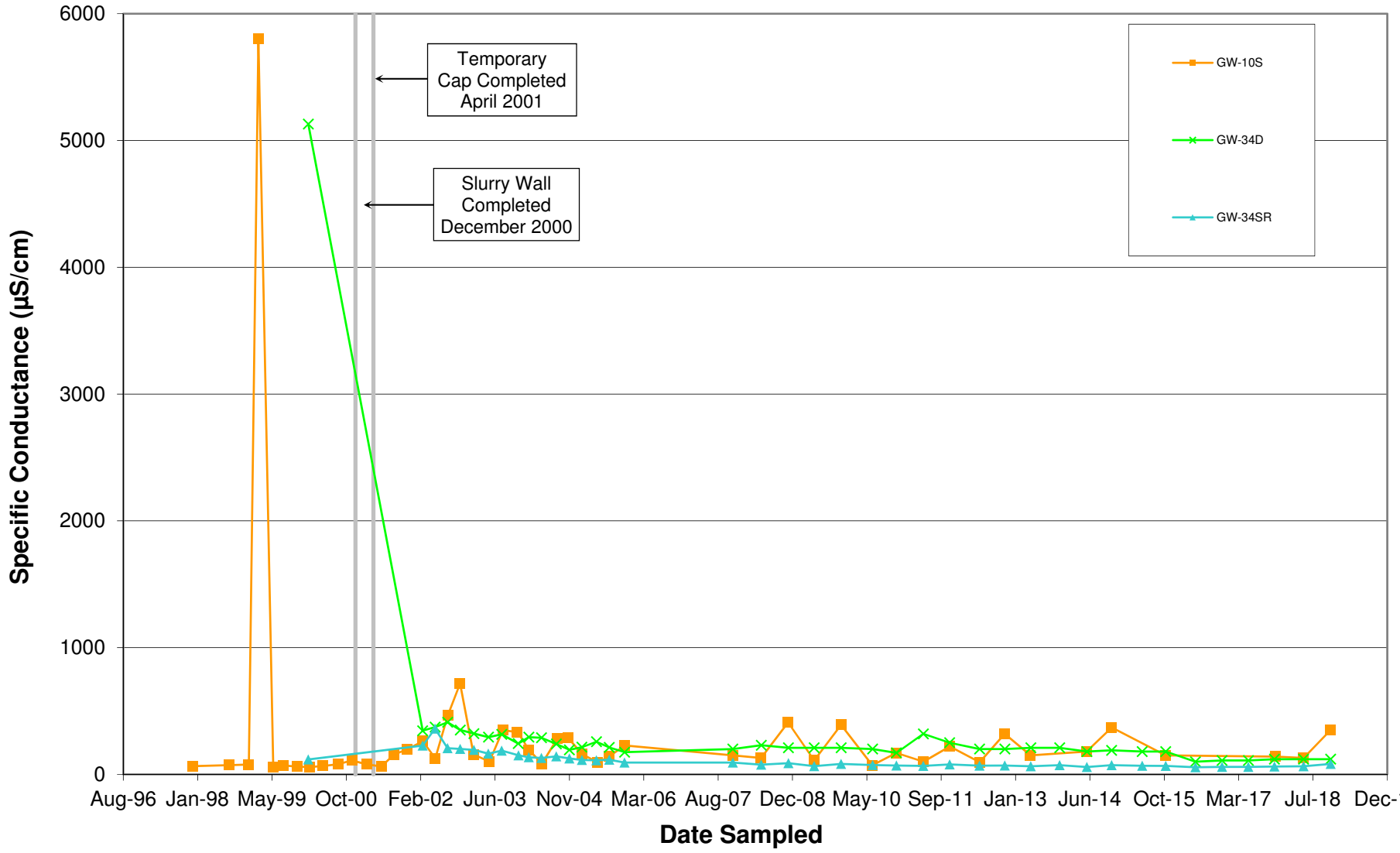
Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Specific Conductance in Groundwater Southeast of Containment Structure Figure D-1.27

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance GW SE

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Specific Conductance in Groundwater West of Containment Structure Figure D-1.28



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

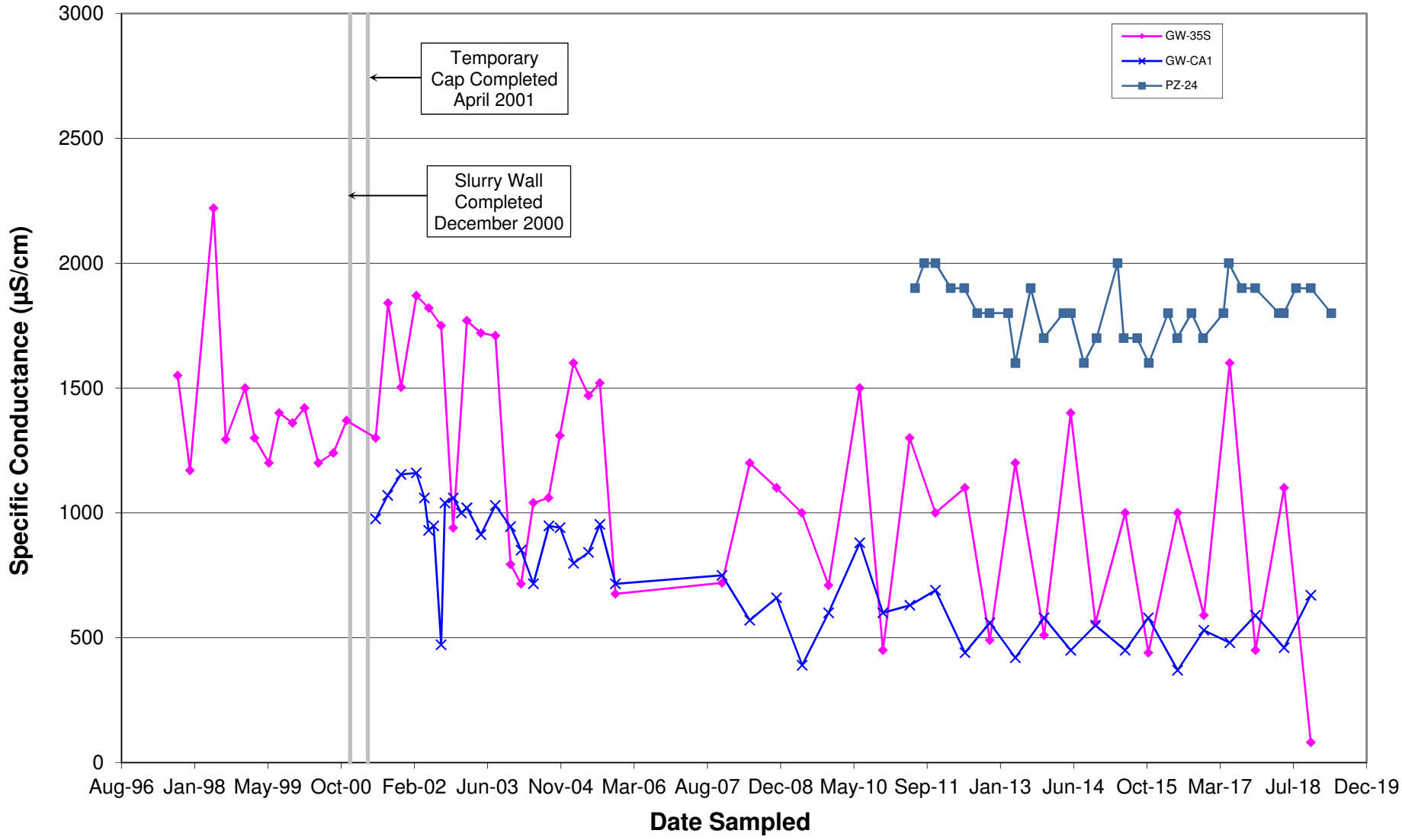
wood.

Specific Conductance in Groundwater
North of Containment Structure

Figure D-1.29

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance GW N

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

wood.

Specific Conductance in Groundwater
Inside Containment Structure

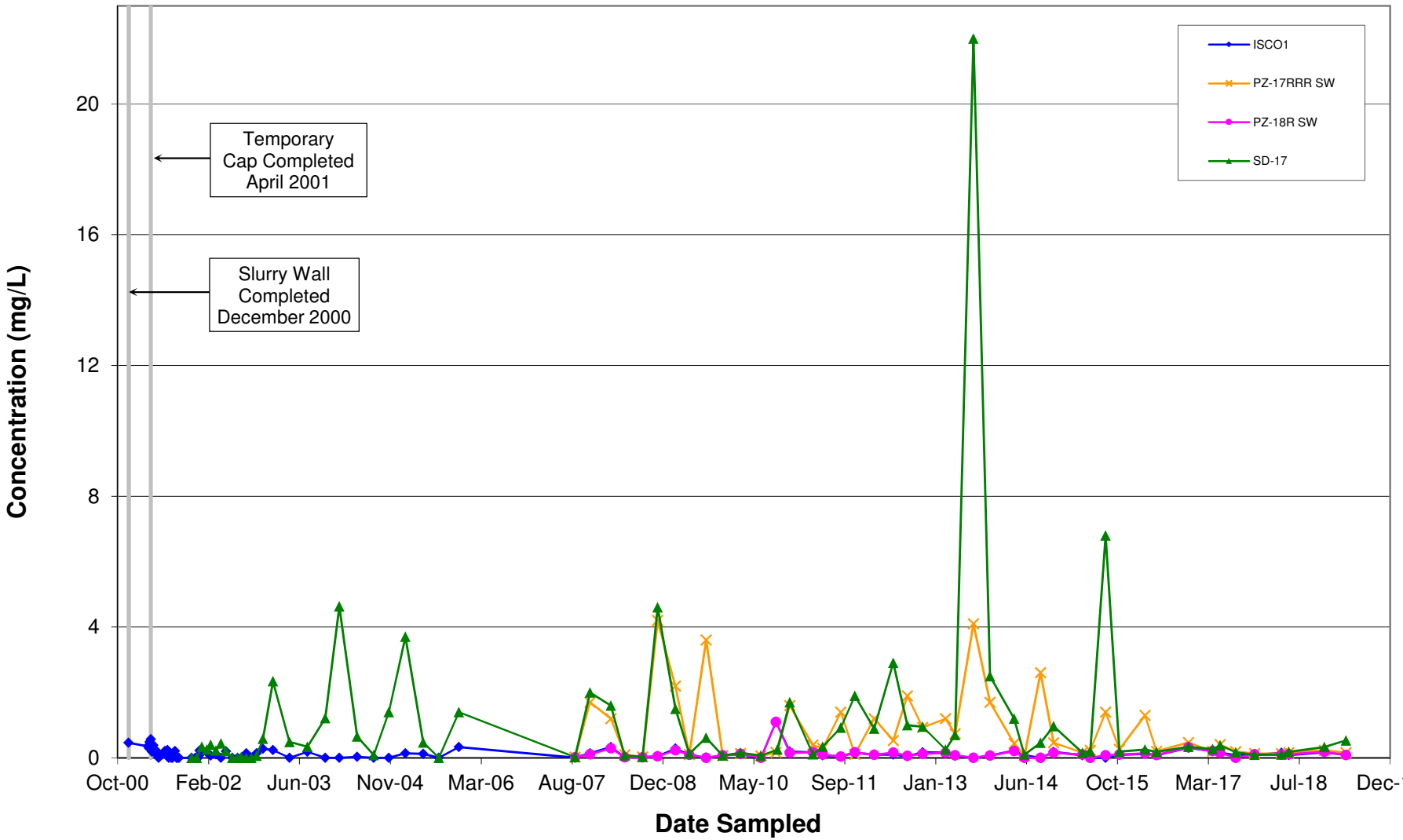
Figure D-1.30

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix D\
Rev_GW_SW Time Series Plots DAPL constituents.xls, SC Inside

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019

Appendix D2

Surface Water
(Aluminum, Ammonia, Chloride, Chromium, Sulfate)



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

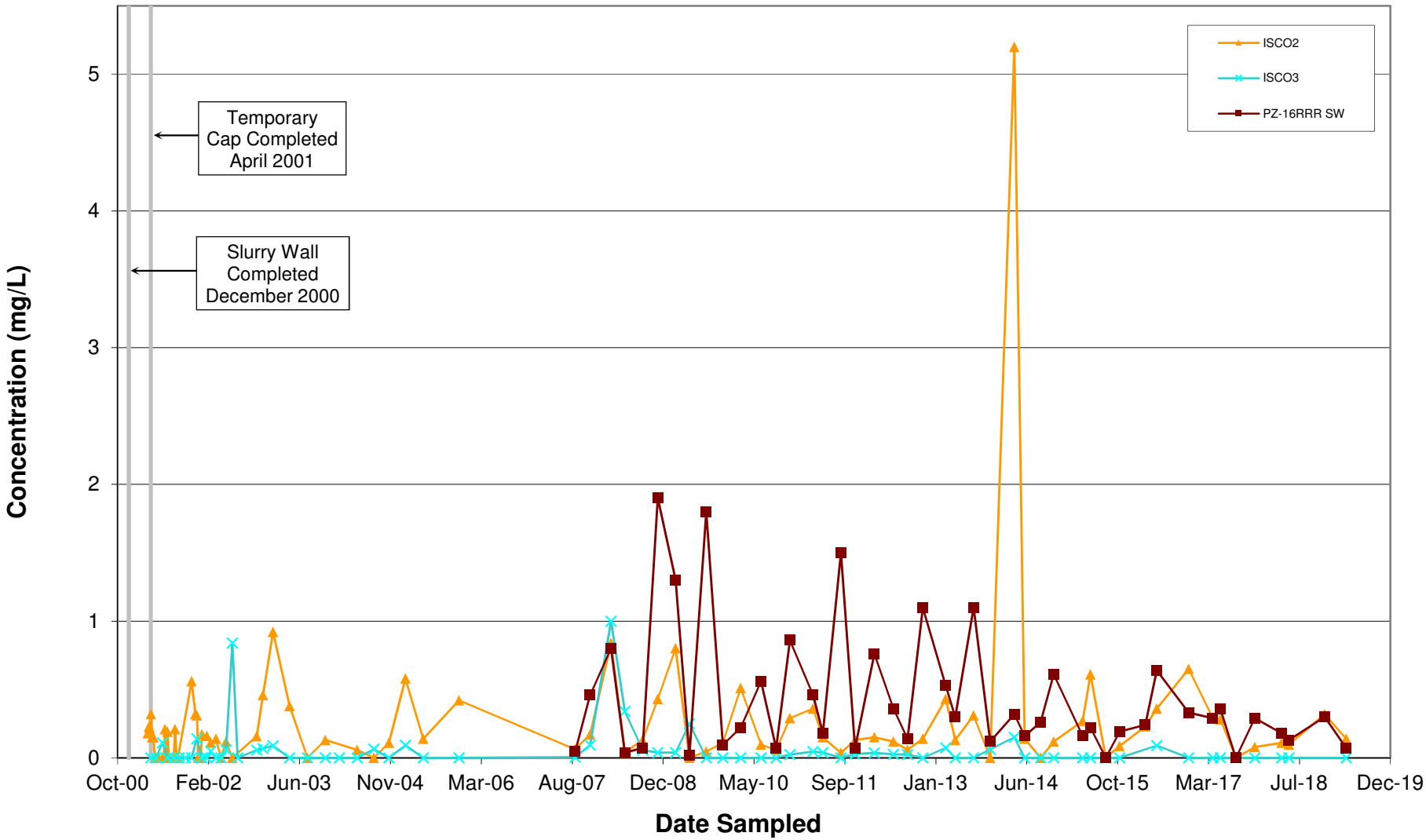
wood.

Filtered Aluminum in Surface Water
in the Upper South Ditch

Figure D-2.1

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Aluminum SW UpperSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

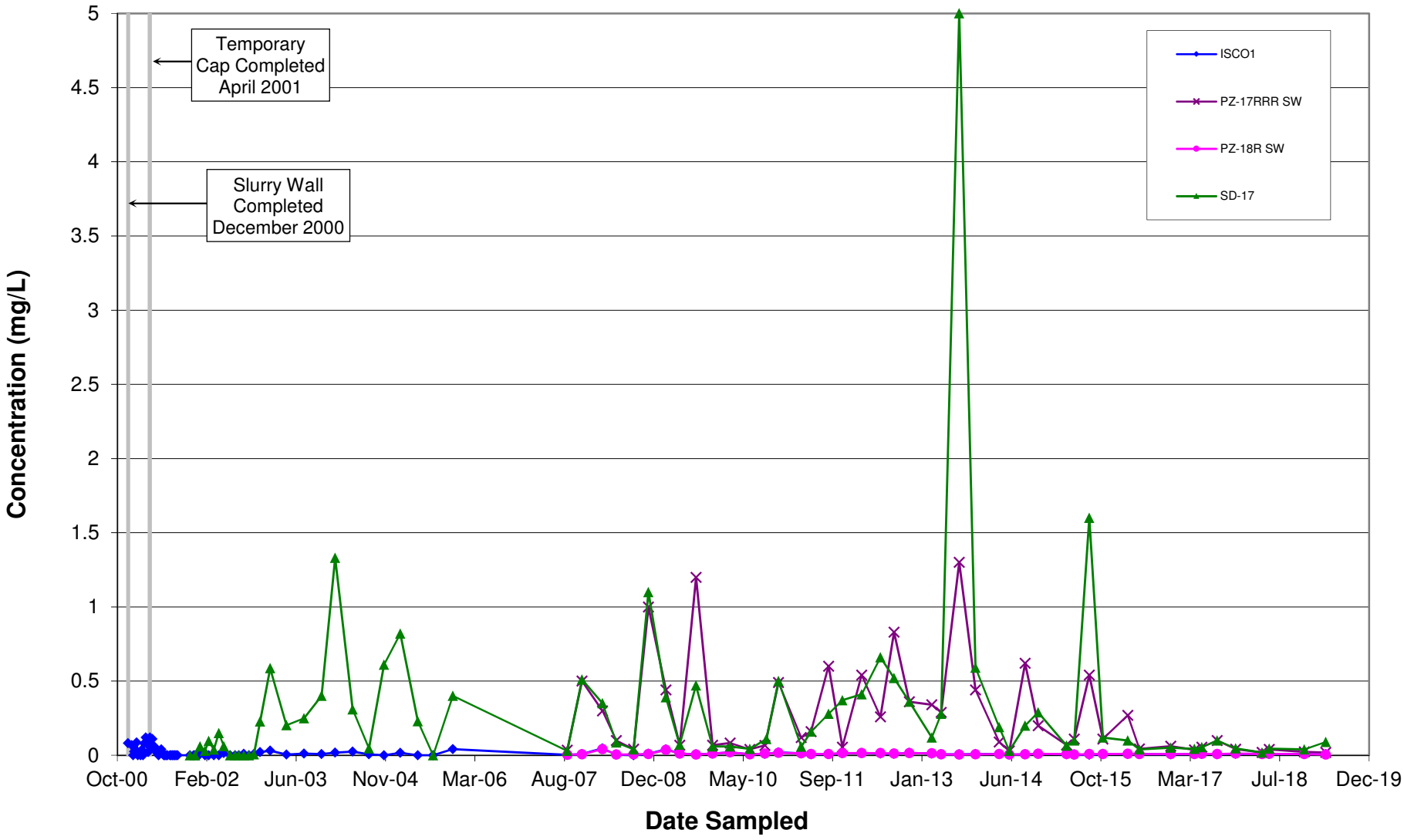
wood.

Filtered Aluminum in Surface Water
in the Lower South Ditch

Figure D-2.2

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Aluminum SW LowerSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

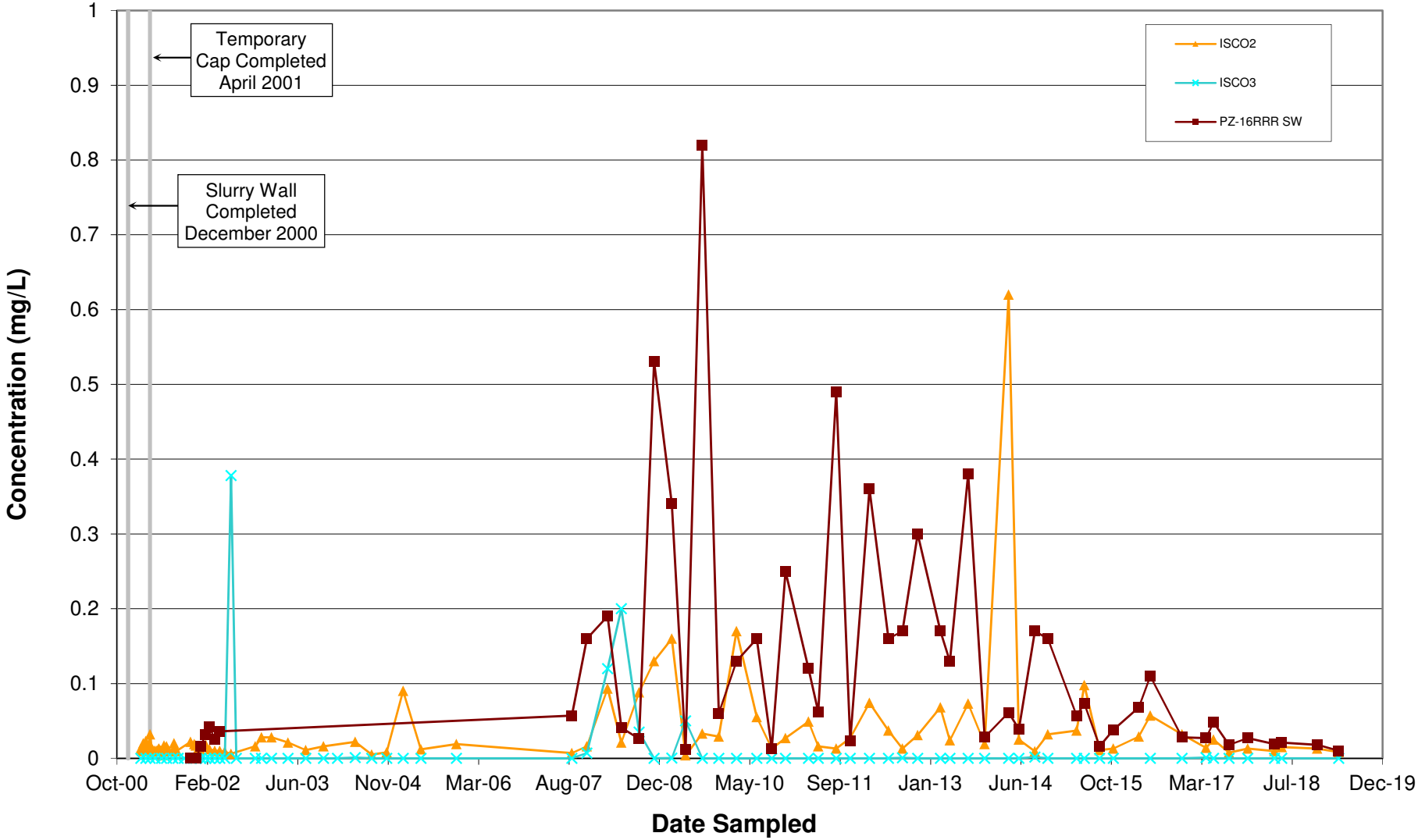
wood.

Filtered Chromium in Surface Water
in the Upper South Ditch

Figure D-2.3

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium SW UpperSD

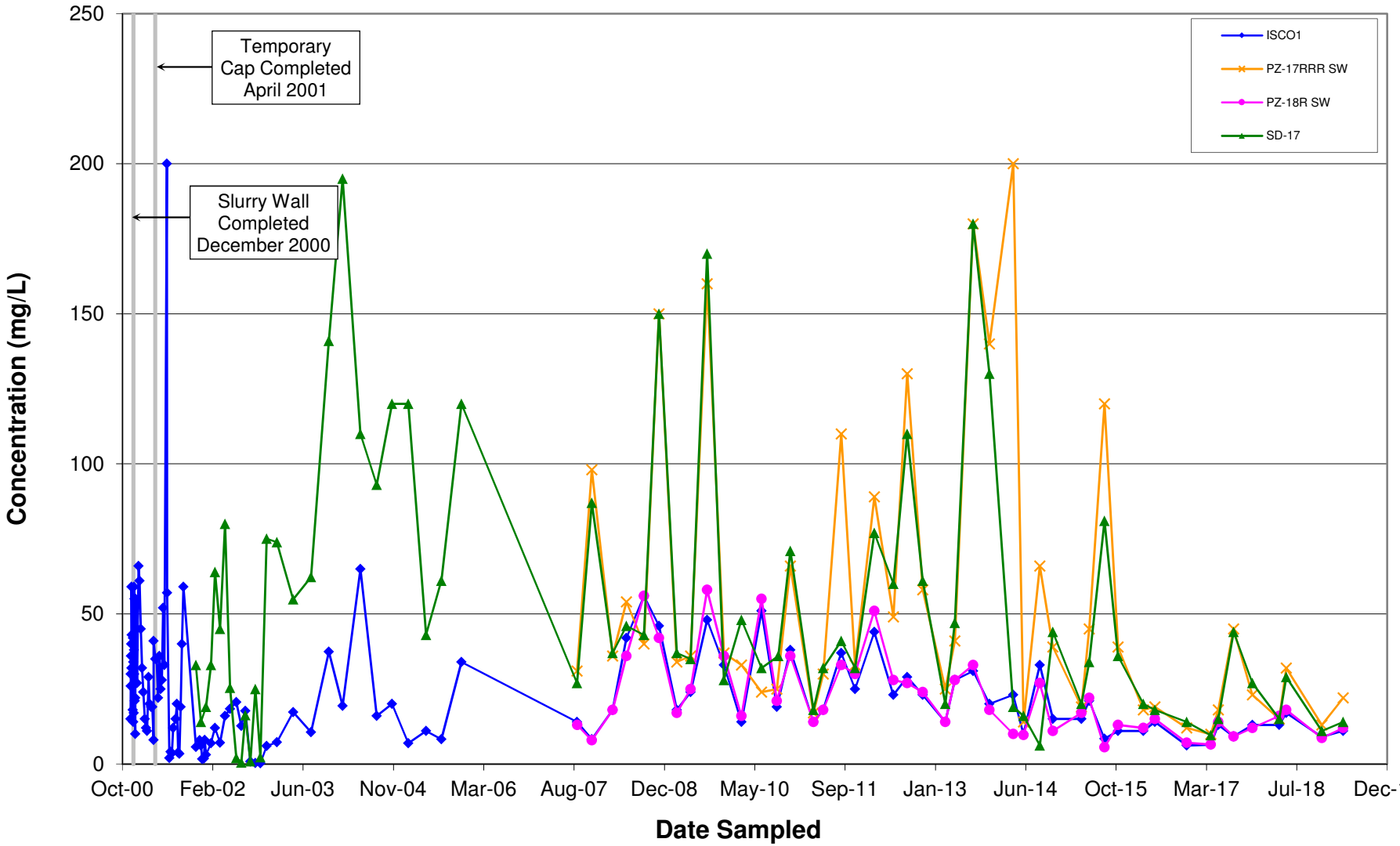
Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Filtered Chromium in Surface Water in the Lower South Ditch Figure D-2.4

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Dissolved Chromium SW LowerSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

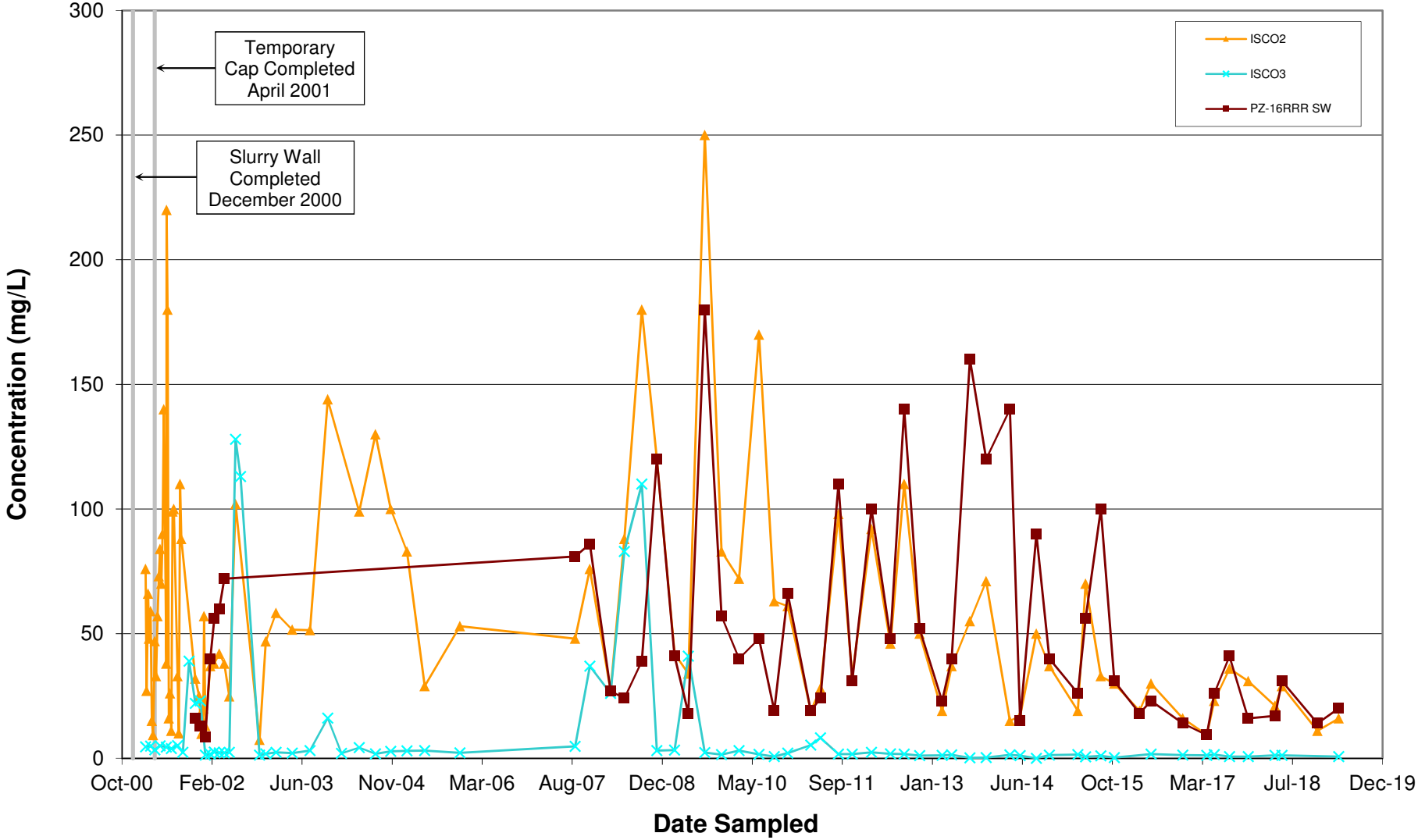
wood.

Ammonia in Surface Water
in the Upper South Ditch

Figure D-2.5

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Ammonia SW UpperSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

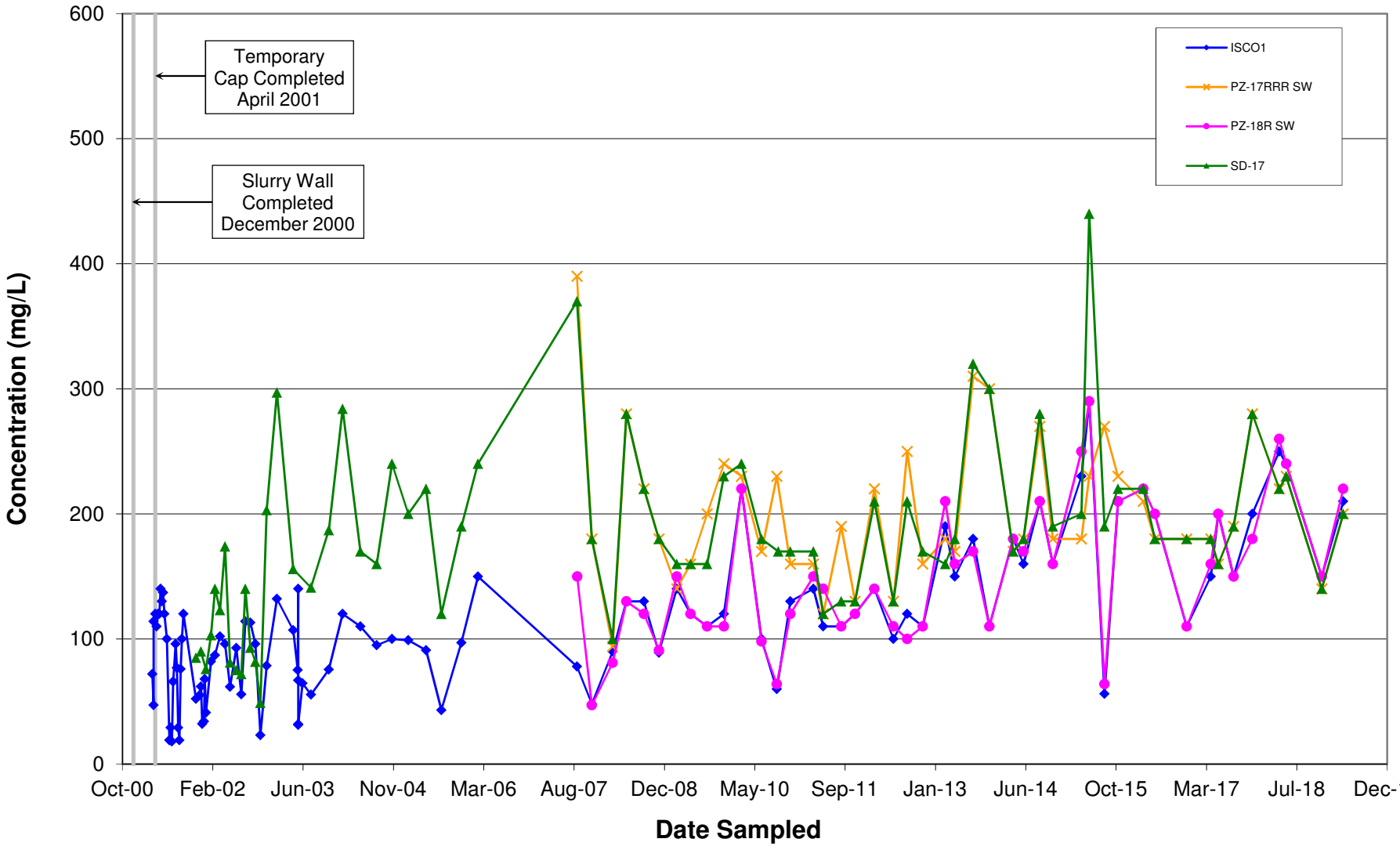
wood.

Ammonia in Surface Water
in the Lower South Ditch

Figure D-2.6

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Ammonia SW LowerSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



Semi-Annual Status Report No. 24
Olin Chemical Superfund Site
Wilmington, Massachusetts

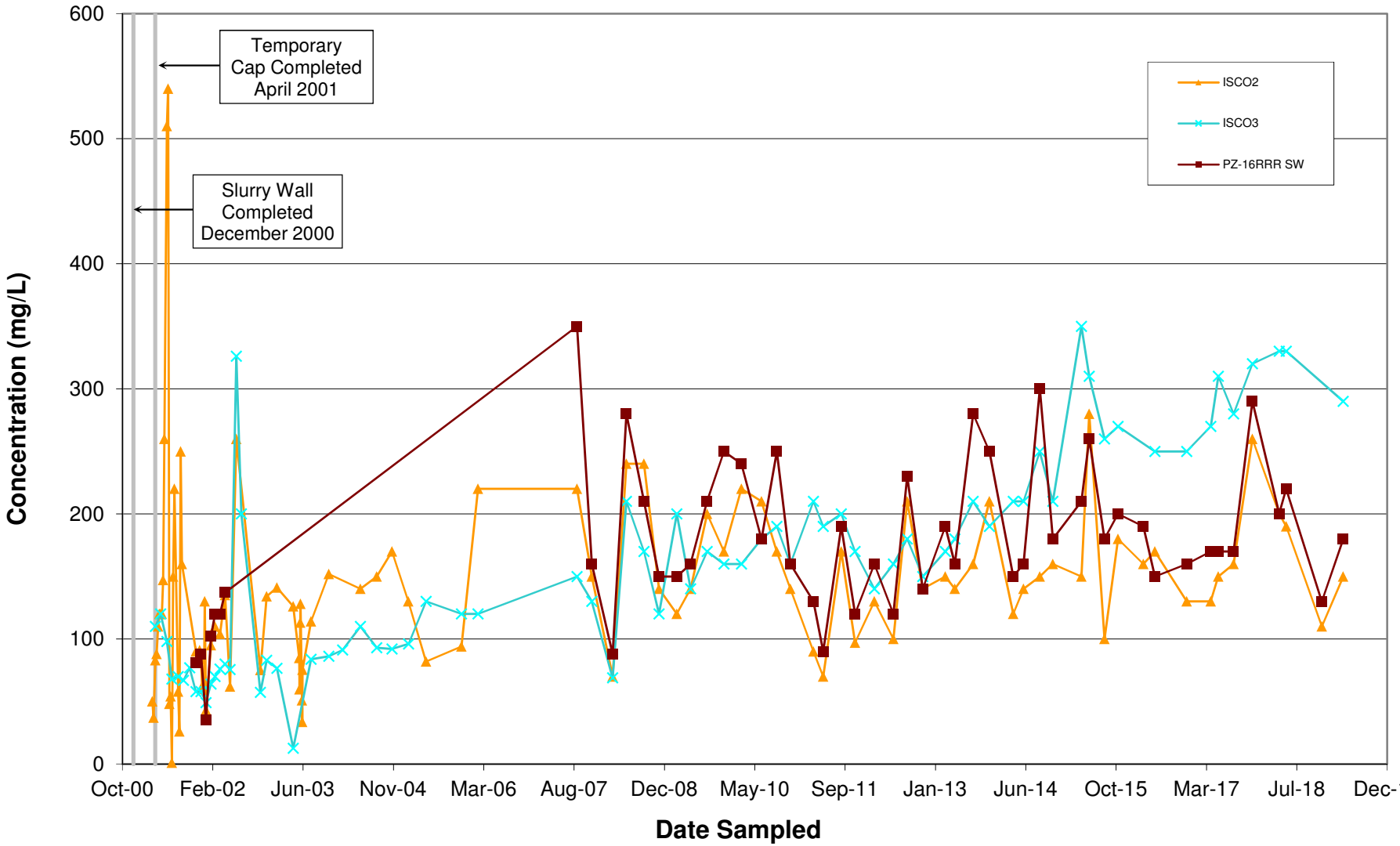
wood.

Chloride in Surface Water
in the Upper South Ditch

Figure D-2.7

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Chloride SW UpperSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



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Wilmington, Massachusetts

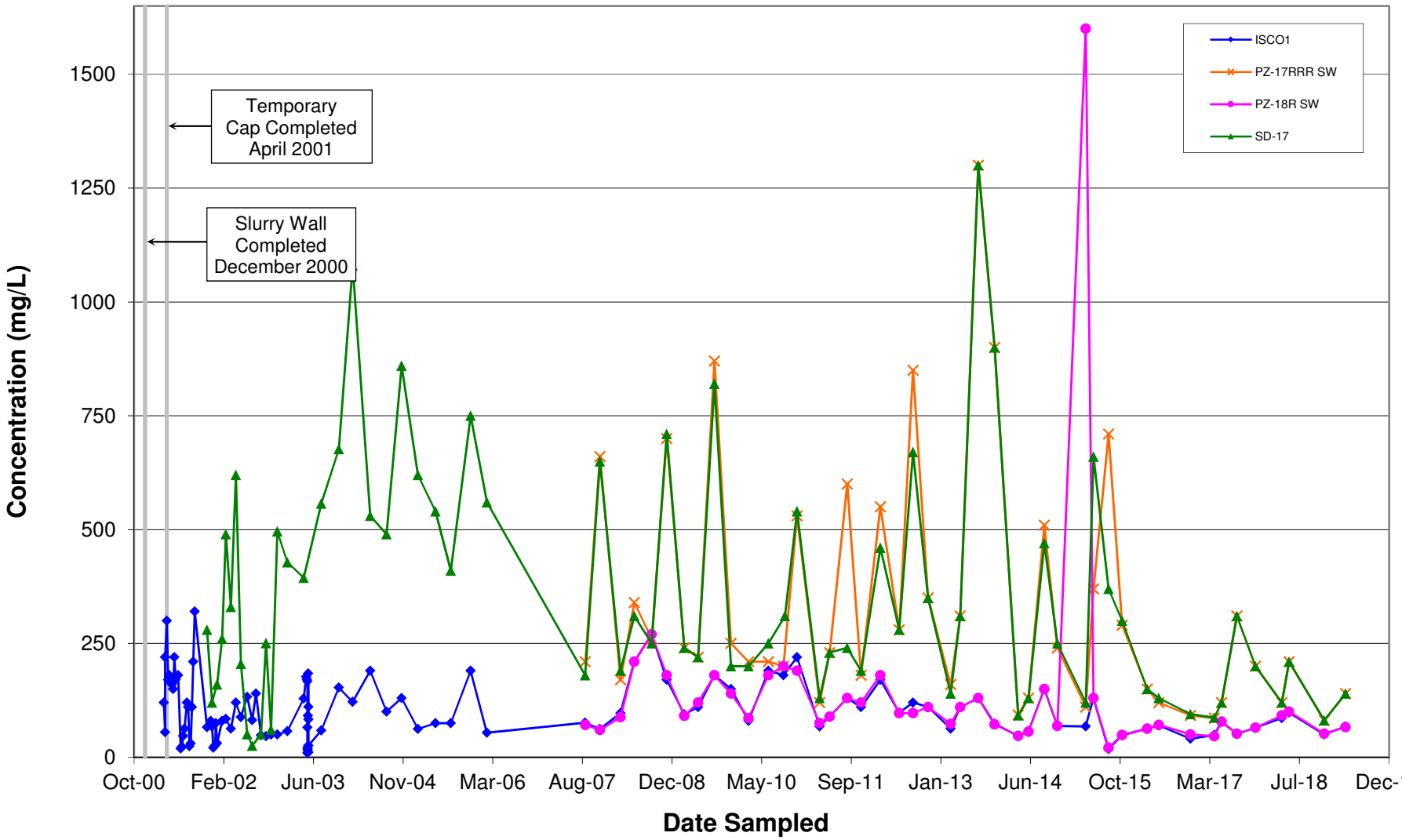
wood.

Chloride in Surface Water
in the Lower South Ditch

Figure D-2.8

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Chloride SW LowerSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



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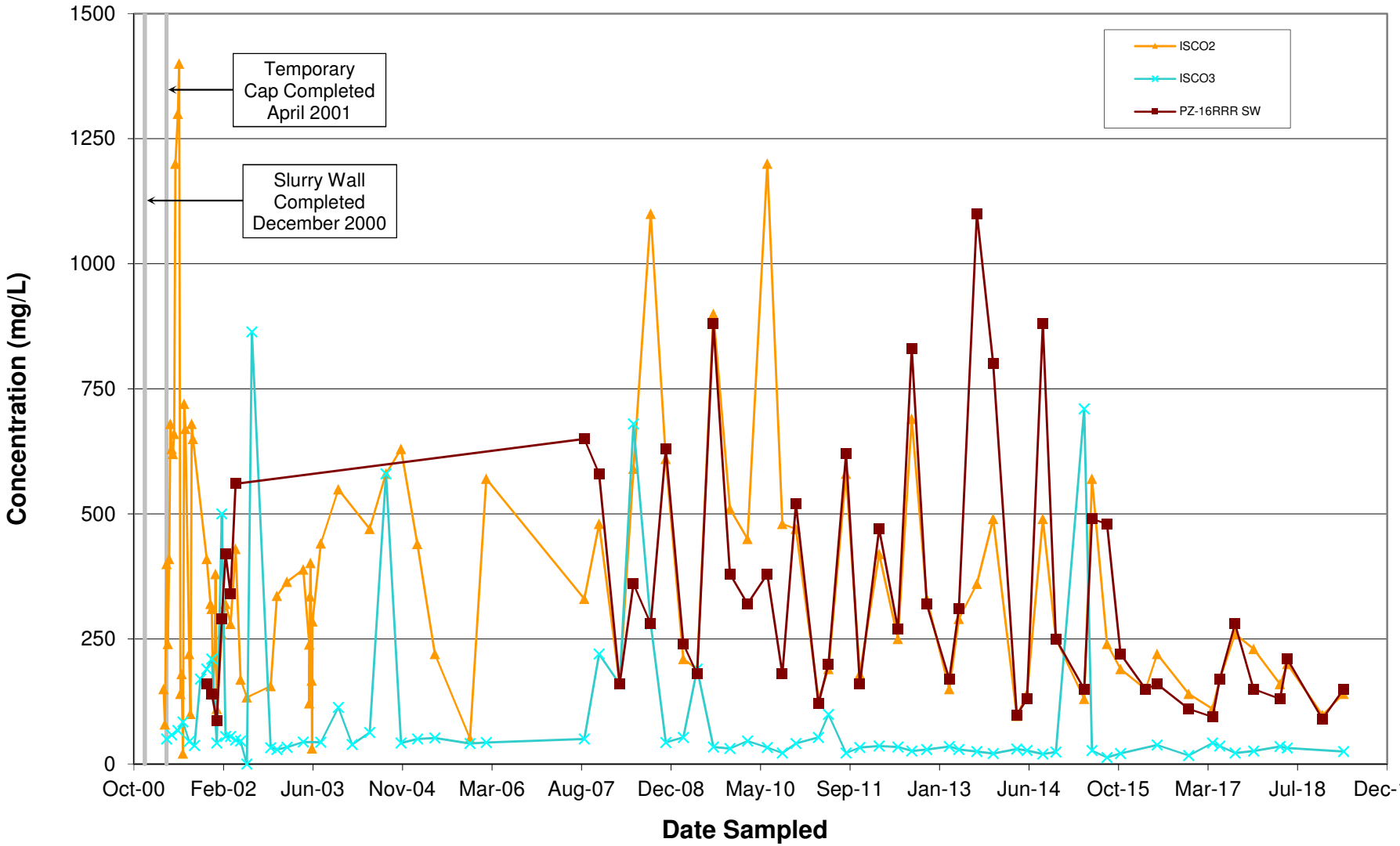
wood.

Sulfate in Surface Water
in the Upper South Ditch

Figure D-2.9

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Sulfate SW UpperSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



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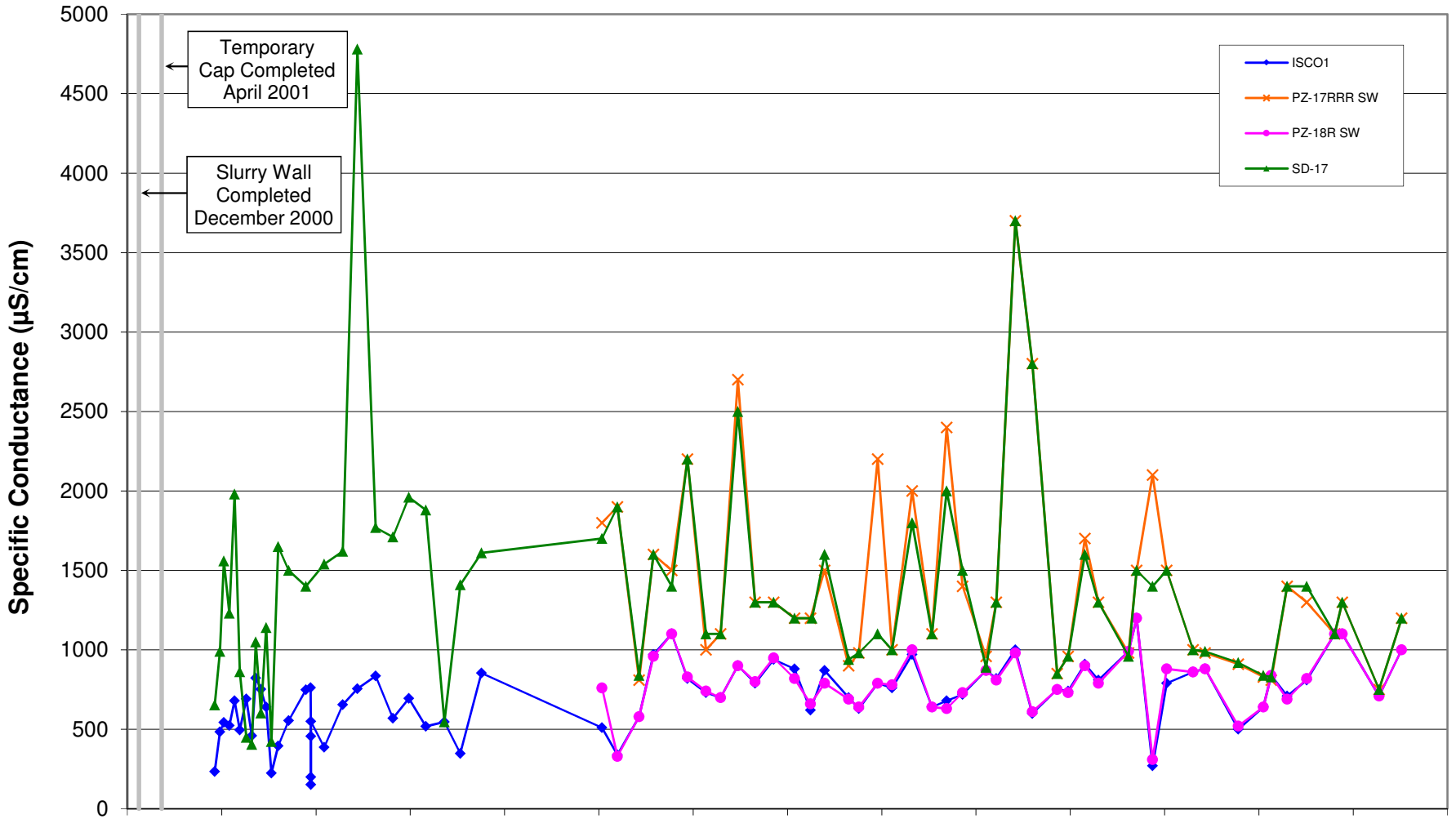
wood.

Sulfate in Surface Water
in the Lower South Ditch

Figure D-2.10

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Sulfate SW LowerSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



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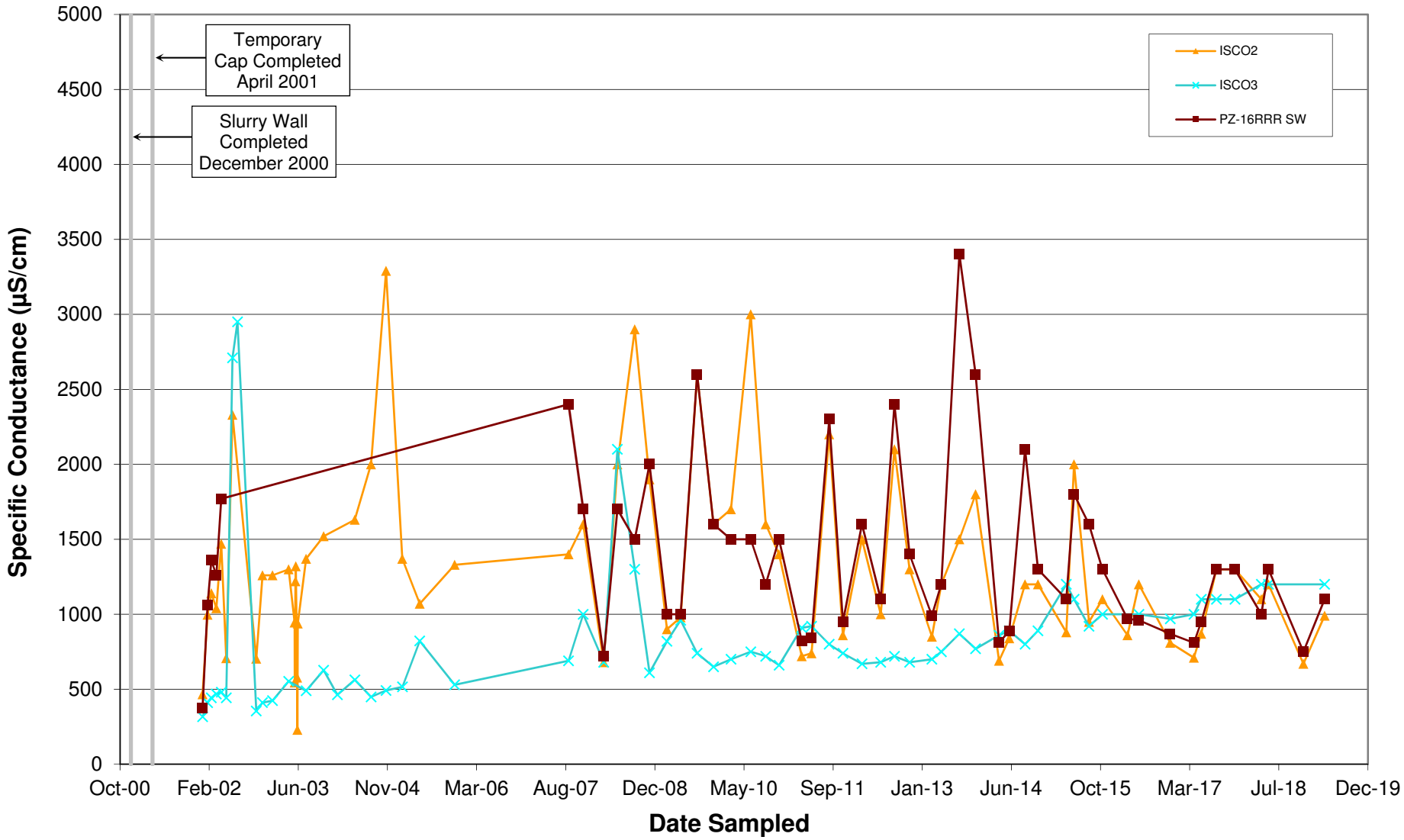
wood.

Specific Conductance in Surface Water in the Upper South Ditch

Figure D-2.11

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance SW UpperSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019



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Olin Chemical Superfund Site
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wood.

Specific Conductance in Surface Water in the Lower South Ditch

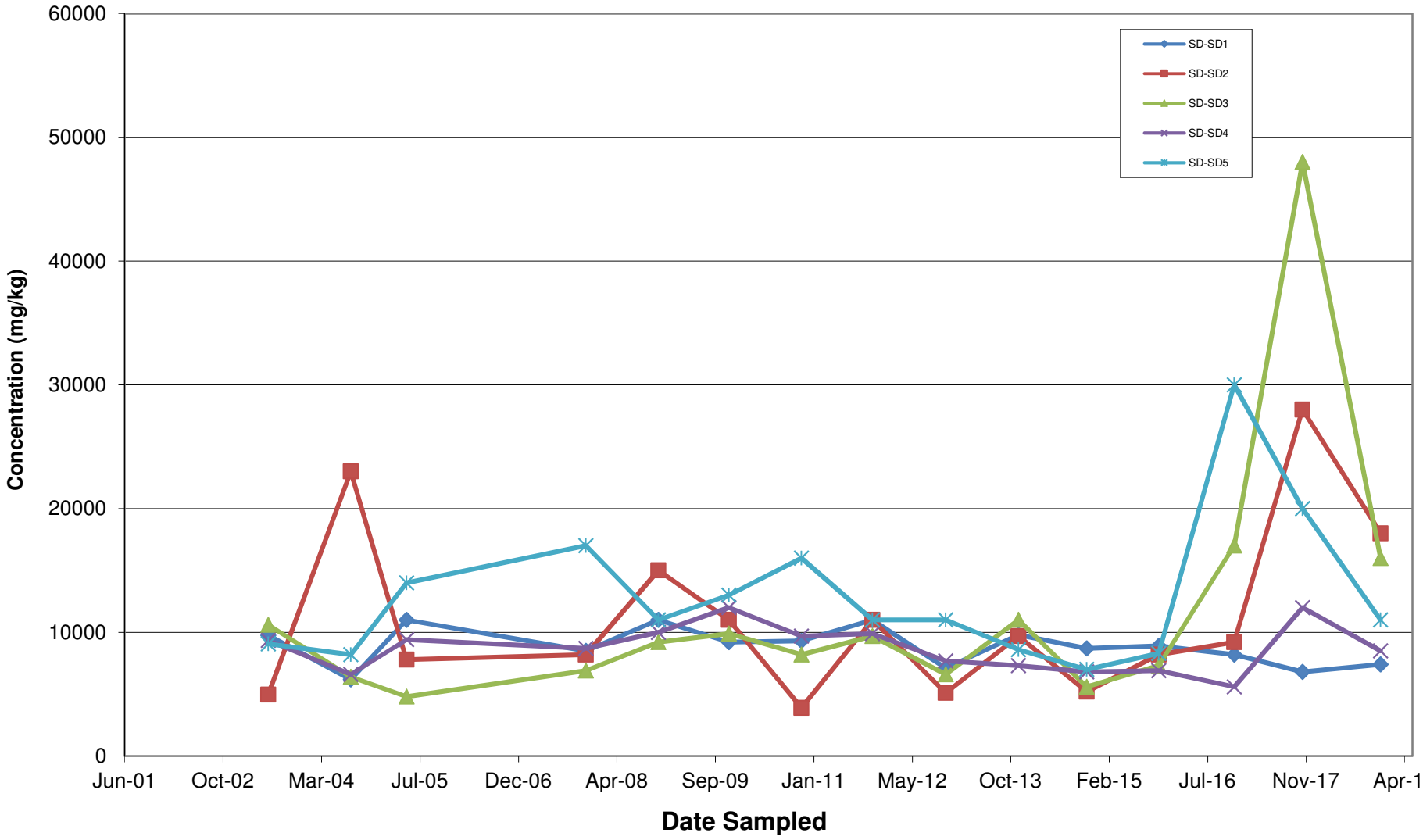
Figure D-2.12

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
GW_SW Time Series Plots DAPL constituents.xls, Specific Conductance SW LowerSD

Prepared by: CTM 06/13/2019
Checked by: SAM 06/132019

Appendix D3

Sediment
(Aluminum, Chromium, Iron)



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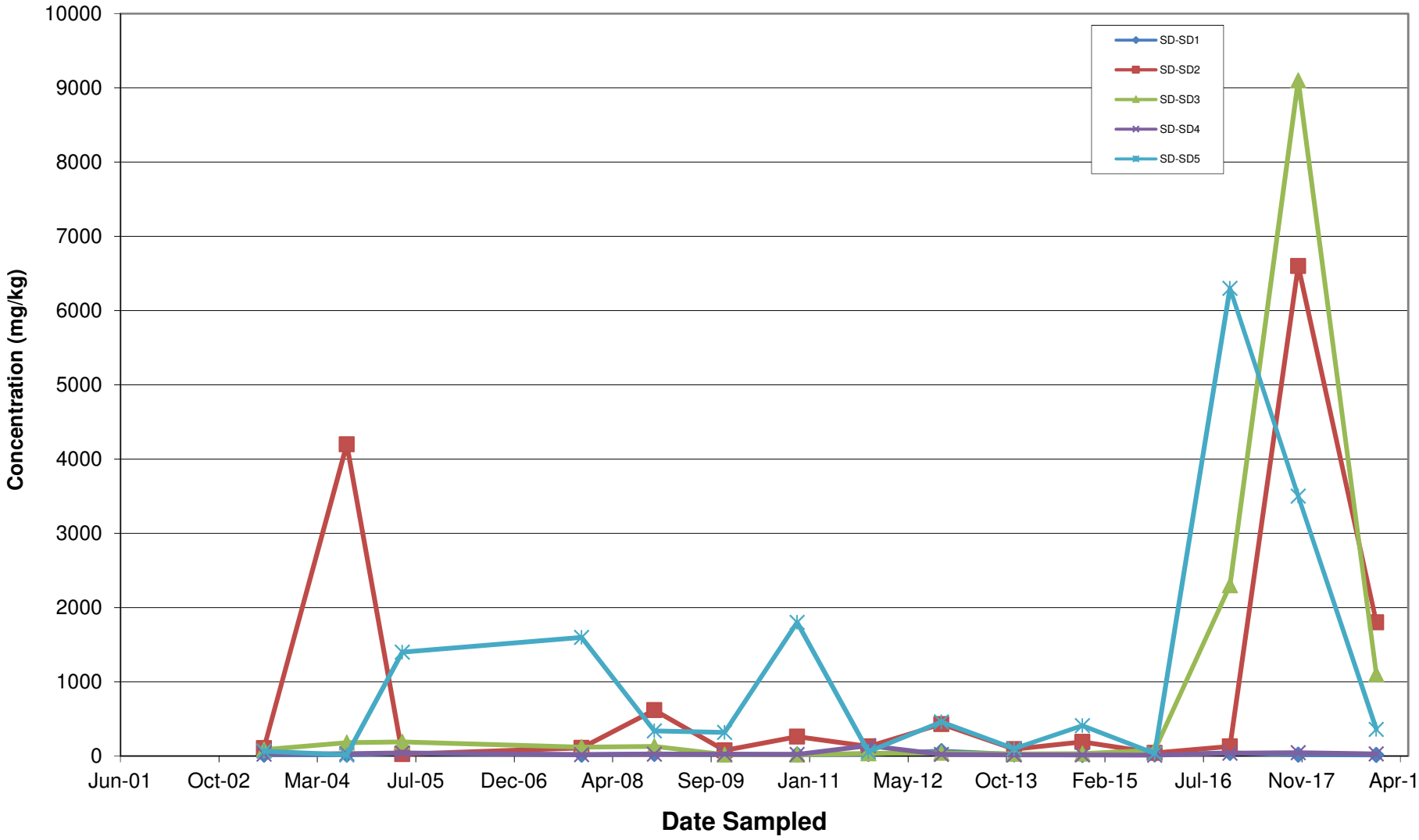
wood.

Aluminum Concentrations in Shallow Sediment (0-0.5 feet)

Figure D-3.1

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
SED-Graphs-IRSWP.xls, Sed-Aluminum

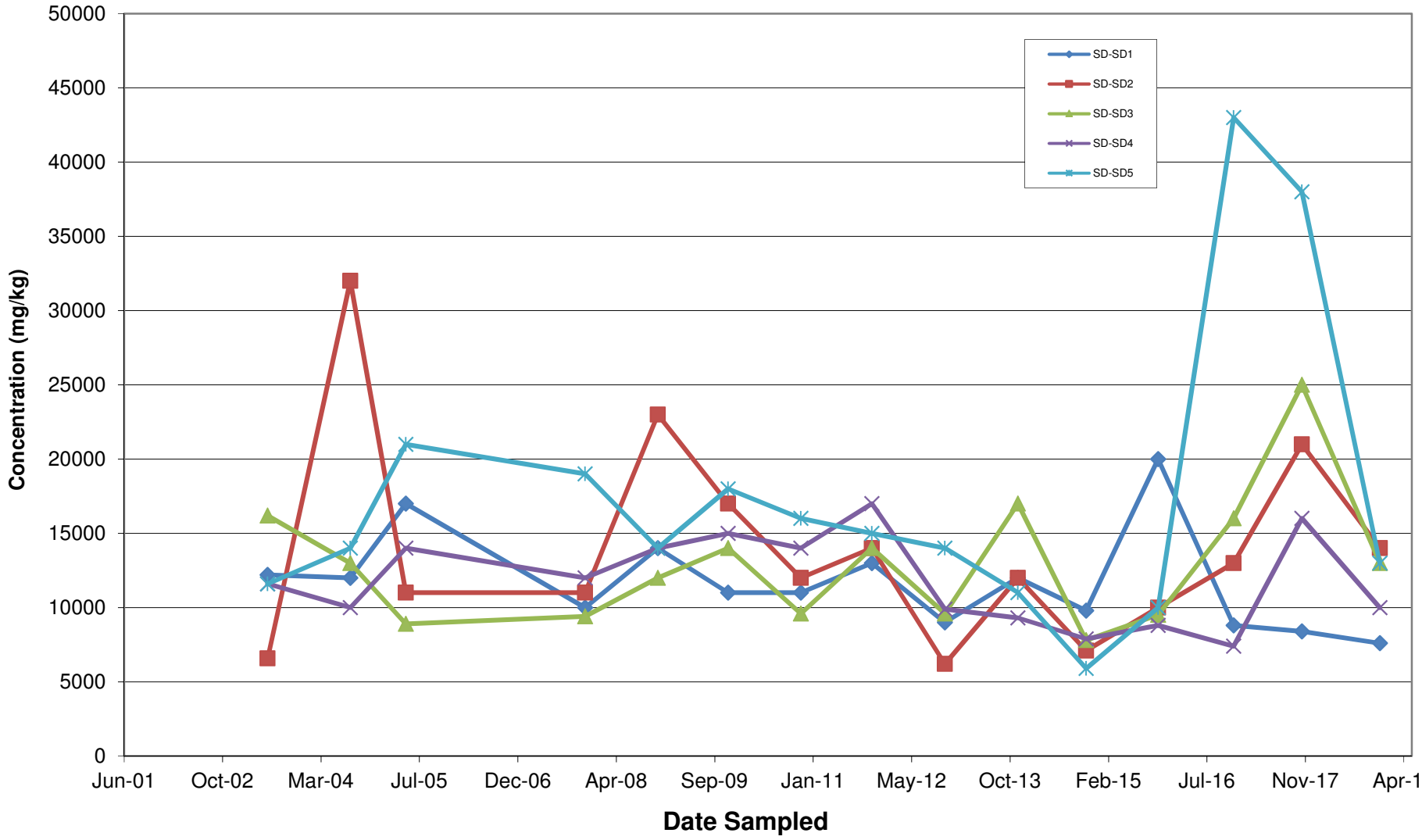
Prepared by: CTM 5/31/2019
Checked by: SAM 5/31/2019



Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Chromium Concentrations in Shallow Sediment (0-0.5 feet) Figure D-3.2

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
SED-Graphs-IRSWP.xls, Sed-Chromium

Prepared by: CTM 5/31/2019
Checked by: SAM 5/31/2019



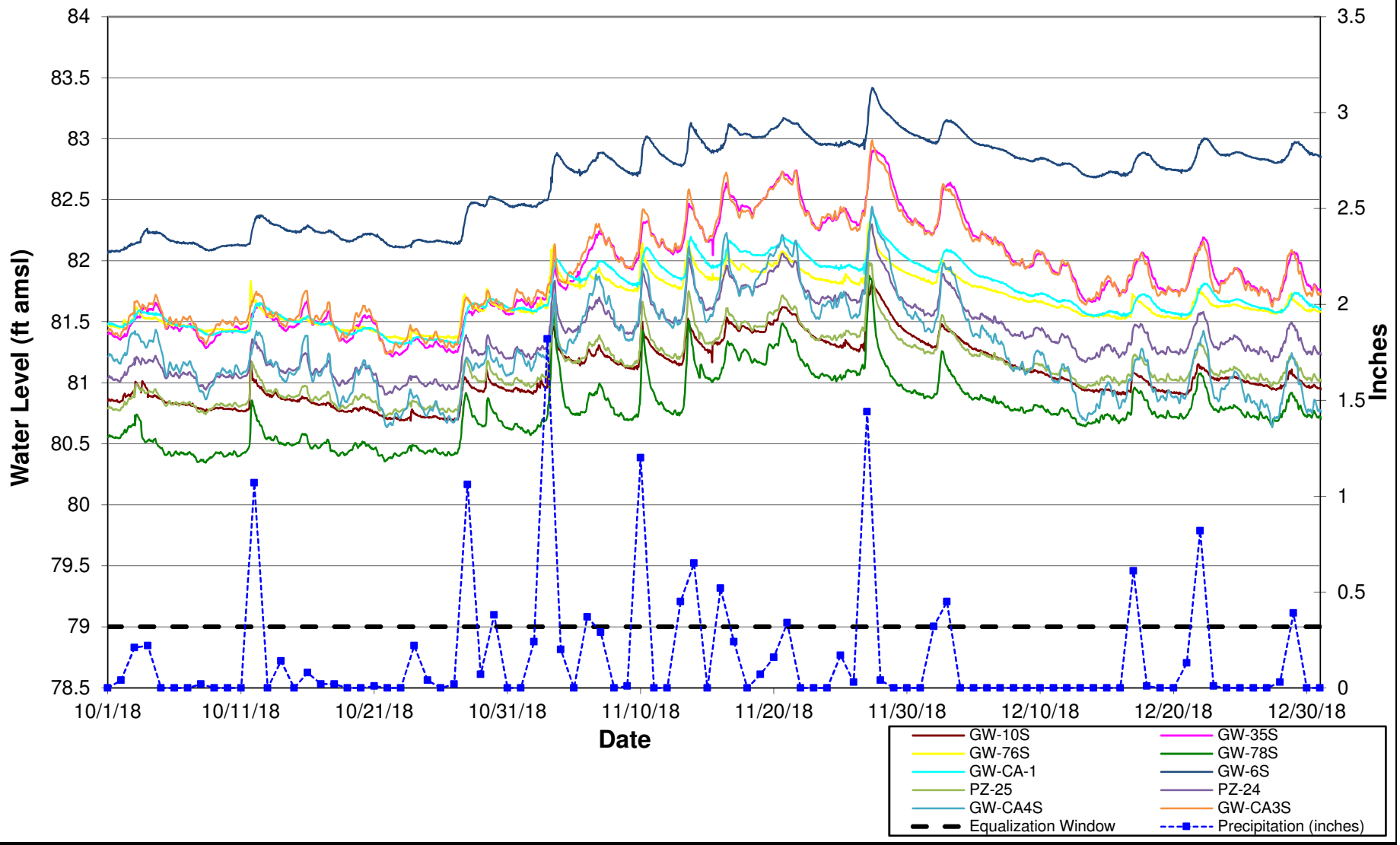
Semi-Annual Status Report No. 24 Olin Chemical Superfund Site Wilmington, Massachusetts	wood.	Iron Concentrations in Shallow Sediment (0-0.5 feet) Figure D-3.3

\\WFD-FS1\projectf$\Projects\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Trends\
SED-Graphs-IRSWP.xls, Sed-Iron

Prepared by: CTM 5/31/2019
Checked by: SAM 5/31/2019

Appendix E

Slurry Wall/Cap Data Logger Water Level Plots



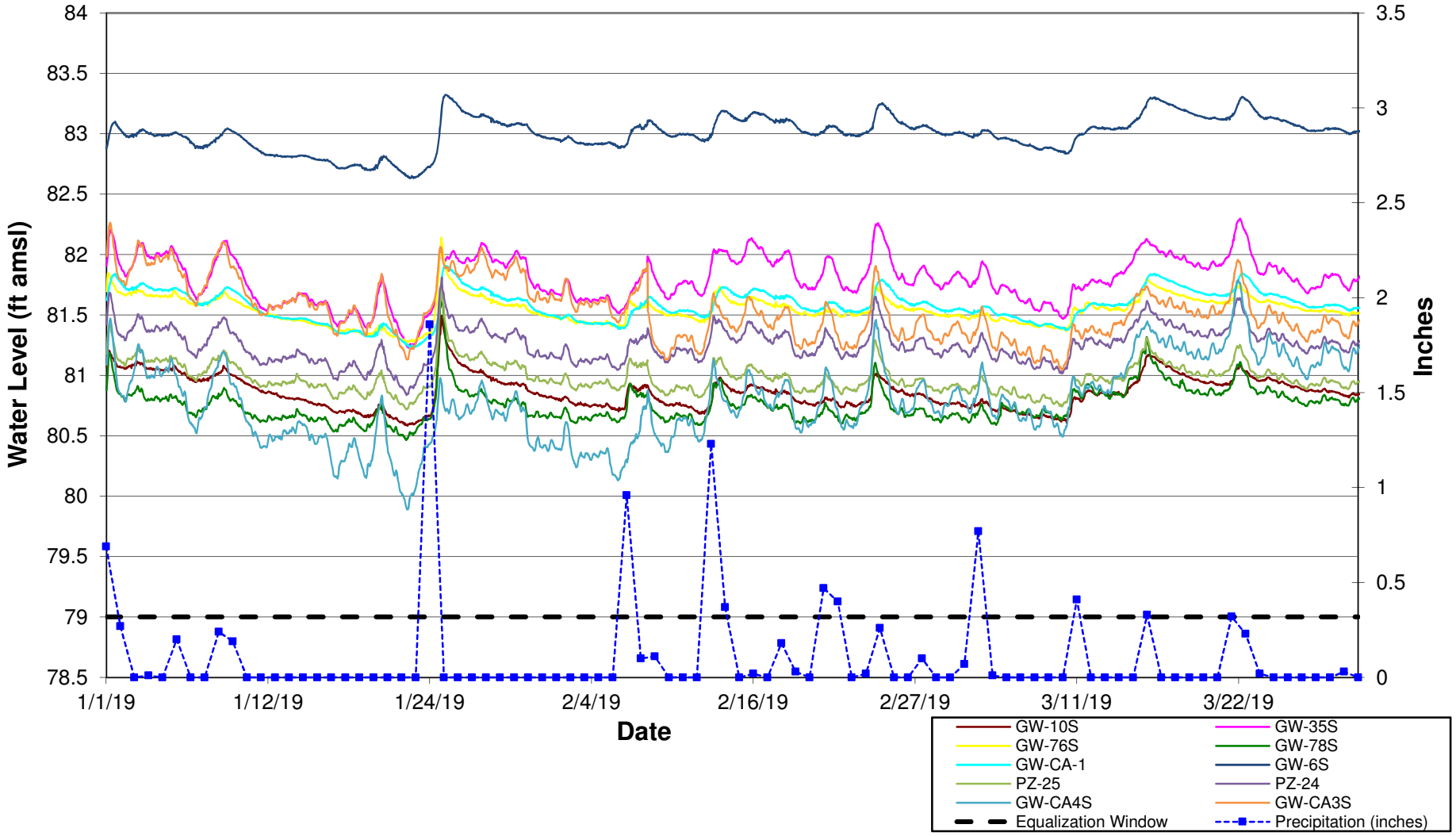
Semi-Annual Status Report No. 24
Olin Wilmington Superfund Site
Wilmington, Massachusetts

wood.

Groundwater Elevation (Corrected for Barometric Pressure) and Precipitation
Fourth Quarter 2018
Figure E-1

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix E\
Olin Data Logger Corrections_SASR 24 QTR 4 1.xls4th Quarter 2018 Fig

Prepared by: JKR 6/30/2019
Checked by: CTM 7/1/2029



Semi-Annual Status Report No. 24
Olin Wilmington Superfund Site
Wilmington, Massachusetts

wood.

Groundwater Elevation (Corrected for Barometric Pressure) and Precipitation
First Quarter 2019
Figure E-2

P:\old_Wakefield_Data\projects\OLIN\Wilmington\SemiAnnual Status Report\2019 July\Appendix E\
Olin Data Logger Corrections_SASR 24 QTR 4 1.xls1st Quarter 2019 Fig

Prepared by: JKR 6/30/2019
Checked by: CTM 7/1/2019